AEROSOL AGE

THE MAGAZINE OF PRESSURE PACKAGING

4/5

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- Aerosol Therapy
- Pyrethrum in Aerosols
- Aerosol Colognes
- G. Barr & Co. Plants
- Pressure Testing
- Three-Phase Aerosols

September 1956

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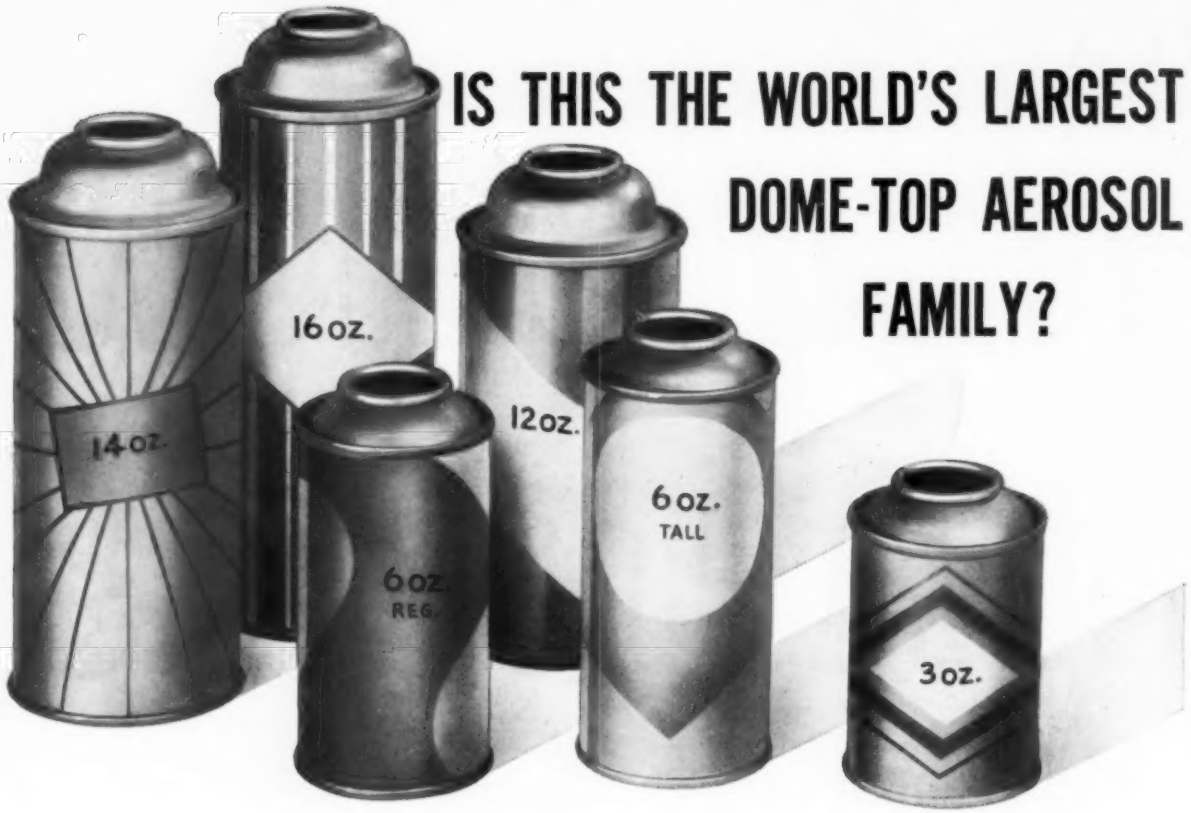

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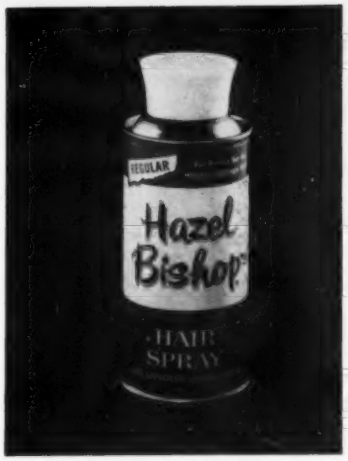

COVER PICTURE

Hazel Bishop, Inc., New York, put a new aerosol on the market August 1. Packed in Continental 6-oz. cans, it has a VCA valve with new directional "spray guide." Filled by G. Barr & Co., Chicago, and Connecticut Chemical Research, Bridgeport. It sells for $1.00.

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The magazine of pressure packaging

AEROSOL AGE

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BRICKBATS and BOUQUETS
from the
MAILBAG

We have found your magazine very interesting, and you are to be complimented on the amount of material which you are presenting covering the aerosol industry. We wish you the best of success with your new publication.

W. E. Baulieu
BRIDGEPORT BRASS CO.
Bridgeport, Conn.

We want to get into contact with firms in the United States manufacturing artificial snow. Will you supply the names of firms who manufacture this product.

Also we are interested in personal deodorants in aerosol form. We have been asked to manufacture aerosol underarm deodorants for sale in this market.

Jean Leon Piraud
PIR-O-SOL SA
Frauenfeld, Switzerland

Thanks for the complimentary copy of the June issue of *Aerosol Age*. We have read your journal with a great deal of interest and congratulate you on the fine job that you are doing. We will certainly subscribe.

Wm. G. Hendrickson
WISCONSIN ALUMNI RESEARCH FOUNDATION
Madison, Wisc.

We are greatly interested in your new publication, *Aerosol Age*. We should like to arrange to receive it by air mail.

We are contemplating setting up a local filling station in Morocco to package insecticides, disinfectants, deodorants, fire extinguishers, perfumes, etc. Can you give us the address of a firm who would be able to furnish us with full particulars on the problems involved and the equipment required for such an undertaking?

Sincerely,
LABORATOIRES MAROCAINS DE DISINFECTANTS
Rue Major Ayrand, Casablanca

We are happy to have an increasing number of subscriptions to *Aerosol Age* from overseas readers. Unfortunately, however, it is impractical to arrange to send copies air mail at this time. — *The Editors*

I have thought for some time of a publication such as you contemplate being of great potential financially as well as exciting.

J. R. Quisenbury
QUISENBURY SUN PRODUCTS CO.
Wellsville, Mo.

(*More Letters On Page* 37)

In the Spotlight this month

- There seems to be general agreement that pharmaceuticals represent the new big field for aerosol expansion. Some of the numerous advantages of "aerosol therapy" are discussed in an article by John J. Sciarra, Univ. of *Maryland*. pg. 14.

- G. Barr & Co. is an important name in aerosol packaging. Their coast-to-coast operations are described in an article by *Aerosol Age's* midwest manager, pg. 18.

- The market for aerosol perfumes and colognes is booming, but much remains to be done in production and marketing of aerosol cosmetics if the full potential of this market is to be realized. A member of the *Aerosol Age* staff surveys the department store market for aerosol cosmetics, pg. 12.

- Because of its effectiveness against a wide variety of insects, coupled with non-toxicity to humans, pyrethrum has been a natural for aerosol insecticides since the first "bug bomb" was made. The role of pyrethrum in aerosol pesticides is discussed by a well known entomologist, pg. 24.

- Three-phase aerosols are a controversial topic in any aerosol discussion. An interview by another member of the *Aerosol Age* staff with the man who did much of the early development work on three-phase aerosol systems is reported on pg. 28.

- Another in the list of new test methods developed by the scientific committees of C.S.M.A.—a method for measuring pressure of aerosols, on pg. 30.

- A report on the aerosol market in the United Kingdom, by our overseas correspondent, pg. 32.

- The significance of oven testing in evaluating the performance to be expected from aerosols on lengthy storage is discussed in Robt. Foresman's monthly column. Pg. 34.

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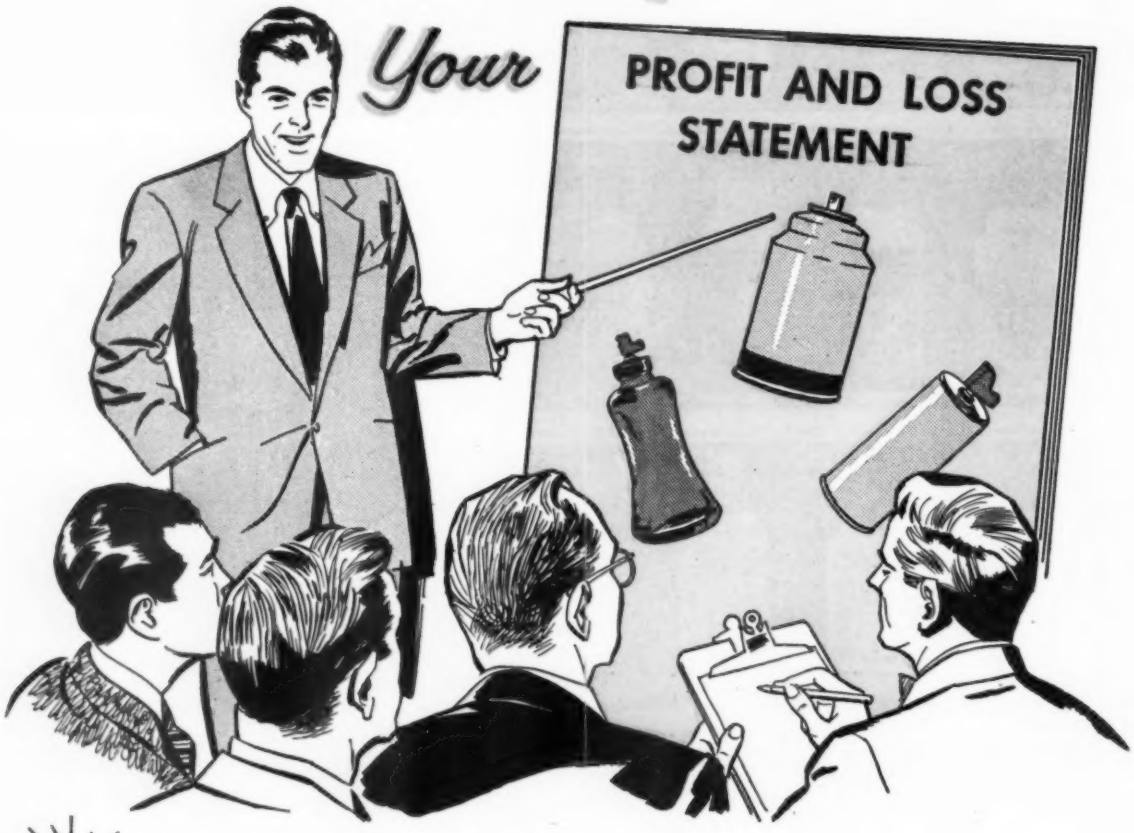

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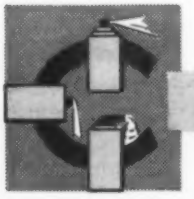

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Editorials

THE new aerosol insecticides are reported to be selling very well this season. One of the new products is capitalizing on the dual-purpose theme, being recommended for use against household insects and garden pests as well. Old timers in the insecticide business have always been sceptical of two-purpose insecticides, but this latest version of the dual-purpose insecticide seems to be going over with a bang in today's market. A dealer we talked to reported he was finding difficulty in keeping the product in stock because it's selling so fast.

Admittedly it is a problem to formulate an insecticide which will combine effectiveness and safety against both household and agricultural pests, but after the laboratories which worked out this particular product had completed their work, independent testers confirmed the data necessary to support label claims

The formula combines methoxychlor, pyrethrins, piperonyl butoxide and rotenone as the toxicants. In addition, there is another undisclosed ingredient which is reported to be responsible for the product's lack of the unpleasant odor so often associated with insecticides, aerosol or otherwise. And it is the solution to the odor problem, as we hear it, that has been responsible in a major way for the booming sales.

Another new product, which is also reported to be selling very well is the first aerosol insecticide to employ what is a brand new formulation this season,—sulfoxide, dieldrin and BR-135. The producer is dramatizing the effectiveness of this particular combination of toxicants by offering $25,000 to anyone turning up with an insect the product will not kill. And they don't expect anyone to collect. The $25,000 is to go to a national charity at the end of the season if no resistant insect is found.

This particular product is not a true aerosol by industry definition, but rather a pressurized insecticide intended to be employed primarily as a residual spray against crawling insects. The Food and Drug Administration has not approved the use of dieldrin in a space spray.

Dieldrin is currently proving very effective against crawling insects, having been substituted for chlordane in some applications. Roaches have developed resistance to chlordane, particularly in the southern states. Just how long dieldrin will remain effective, only the future will tell.

As a matter of fact a point which is often overlooked in evaluating new products is "How long will they last?" There are numerous insecticides, aerosol and otherwise, that have been on the market for years and years and which continue to sell consistently, and to perform efficiently. New products offer novelty value, to be sure, but the only true test of any product is long term sales appeal and efficient performance over a period of years.

THE Chemical Specialties Manufacturers Association has announced opening of entries for the 1956 Aerosol Awards competition. (Details elsewhere in this issue, pg. 45.) An even larger entry list is looked for this year in view of the continued expansion in aerosol packaging.

Those who have competed in previous years need no introduction to this event sponsored annually by the C.S.M.A. For newcomers to the industry, it should be emphasized that membership in C.S.M.A. is not a prerequisite to entering the competition. The rules specify simply that a product to be entered must have been on the market and have been freely offered for sale prior to September 1. Entries close October 15th.

Awards are made "on the basis of general sales appeal of the complete package." Some have voiced the opinion that sales appeal alone is an

(*Turn to Page* 55)

CUSTOMER REACTION *to aerosol Colognes and Perfumes*

WHAT do women think of aerosol perfumes and colognes? Are they storming the perfume counters asking for their favorite fragrances in this new type package? Do they like the aerosol package? Why do they like it? Is it easier to use? Are there any difficulties involved in use of cosmetic aerosols? What are the factors that the shopper considers in making a purchase?

Aerosol Age wanted to know what customer reaction is to aerosol-packaged colognes, perfumes and toilet waters, and therefore talked with salesgirls and buyers in a dozen New York City department stores. We also talked with women customers at the perfume counter—and to make a long story short: there's still a big job to do in selling aerosol perfumes and colognes. A big job in selling the product, a big job in letting women *know* of the new package, and an even bigger job remains for the production department.

One fact that impressed this reporter particularly as a result of talking to the buying public and the salesgirls is the realization that the layman is not conscious of what aerosol packaging is . . . and he is not particularly interested. Women are inclined to think of aerosol perfumes and colognes simply as containers "to which an atomizer is already attached" . . . and basically, for their purposes this definition is probably quite accurate. The same definition applies to the very popular hair sprays and conditioners, with which women are already quite familiar.

The term "mist" is apparently being sold to the public to describe the aerosol perfume and cologne package, i.e., "My Love Mist", "Replique Mist", "Coty Perfume Mist", etc. In the latter case, it is to be noted, however, that the "Coty Perfume Mist", like several other products which carry similar nomenclature is not an aerosol perfume, but a toilet water. The customer has to check with the salesclerk as to whether the product is a toilet water, cologne or perfume. (Some uniform terminology for the aerosol cosmetic product would seem to be indicated, but perhaps this will evolve in time.) To further comment on terminology and customer impressions, it seems that the average woman still thinks of an "aerosol" as the original insecticide "aerosol bomb." The term simply stuck . . . and not too much has been done to change this impression.

On the other hand, we're pleased to note that trade magazines in the cosmetic and fashion fields seem to be doing a fine job in helping to educate the salesgirl on some of the technical aspects of this new type package. She in turn, can, of course, be of much assistance in informing her customers. A recent article* for the "Perfume School of Beauty Fashion" directed to the perfume salesgirl, gives her a complete background on preparing and packaging aerosol perfumes. The article includes several illustrations of aerosol packaging equipment, and introduces the salesgirl to the basic ingredients of aerosol colognes, handling problems, etc. As a matter of fact this sort of information will be invaluable in

* "Seeing the Perfume Aerosol Assembled" *Beauty Fashion* July, 1956.

stressing to women customers that they must restrain an inevitable feminine curiosity and resist the urge to force open the pressure package. The industry has been careful to label aerosol containers against misuse, but the public is noted for its lack of caution, and its refusal to follow or even read instructions.

We did not intend to mention department stores by name, in reporting our survey, but feel that because of a particularly good job done on aerosol cologne displays, we should give due credit to Gimbels, New York. Not only were the major fragrance lines given ample display space in this store, but salesgirls seemed to be well informed on aerosol colognes and perfumes. Gimbels also had a display which made specific reference to the products as "aerosol colognes."

On the other hand, imagine our surprise in walking through the perfume and cosmetic department (consisting of six counters) in another of New York's largest department stores, and seeing not even one of the new aerosol colognes or perfumes on display. We all know of Dana's beautifully packaged aerosol colognes, those of Lentheric, Helene Curtis and Ciro's to mention a few . . . and not one of these products was either on the counter or in the outside display cases. Addressing one of the salesgirls in this particular store, we found she had no idea of what we were talking about when we asked about pressure packed colognes. Fortunately, another of the young ladies proved to know of the "mist colognes" and ventured the statement that "they are catching on."

Further inquiry developed the fact that this store carried almost all of the well known aerosol colognes in stock . . . but they had to be asked for and were brought out from behind the counter. Obviously prospective buyers will have to learn of these products either from magazines, newspapers, TV commercials or other department stores. We must admit, however, that this was our only unsatisfactory, or we should say disappointing experience with the selling crew . . . but it reminds us that a stern effort must be made to acquaint women with this new package.

Based on our interviews, only a small percentage of women have actually sought the "mist colognes" in making purchases, and this group did so as a result of seeing one of the few advertisements in the newspapers. Some salesgirls told us that "yes, women are asking for the 'mist colognes'" — but this comment was made so half heartedly, we wonder how sincere it was and how large a group it covered. In general, salesgirls reported they have to acquaint customers with aerosols, and suggest to them that they may want to try this package. Customer reactions to such suggestions, however, have shown what some of the limitations of the package are, and where more research is needed.

Women have been sold on the idea of an "individual fragrance" . . . a scent "Which is the symbol of herself", which will be associated with her whenever it is recognized. As a matter of fact, an interesting article* projecting the theory of an "individual fragrance" to a woman's belongings, and every room in her home suggests an even further potential here for aerosols. The fact remains, however, that many women tend to follow this theory of a personal aroma, and consistently use the same perfume, cologne, toilet water, bath powder, etc. At this stage, however, not all fragrances are available in the new "mist package", and until they are, sales are limited to some extent to that group desiring the particular scents available. Even these potential buyers, according to salesgirls interviewed, are not entirely sold on the mist package, because the "scent is different." Some women customers indicated that "Fragro Mist" does not smell like "Fragro" . . . and "Smello Mist" does not smell like "Smello." To this observer, on the other hand, the scents seemed to be

*"Home Fragrance with Aerosols," by Virginia Meredith, *Beauty Fashion* July, p. 20, 1956.

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department store salesgirls and buyers interviewed to learn how the average shopper likes pressure packed cologne

by Eleonore Kanar
Staff

Photo: Continental Filling Corp.

aerosol therapy

Photo Courtesy Riker Laboratories

THE application of aerosol therapy in medicine is not new. Such devices as the burning of sulfur candles to disinfect the air, the spraying of operating rooms with germicidal materials, have all had evolutionary significance in our thinking. Steam inhalations and the inhalation of smoke of asthma powder are early, still useful examples of aerosol therapy of the lungs. When the physician recommends that his patient go to the beach and partake of the benefits of salt air, he is suggesting, perhaps unknowingly, the therapeutic use of the tiny salt particles in the air produced by the atomization forces of the breakers.

Aerosol therapy may be defined as the medicinal administration of fine solid particles or liquid mists as inhalants. This can be accomplished by several methods which include atomization, nebulization, vaporization, and aerosolization, all being mechanical means of producing fine particles. This paper deals with the pharmacologic activity of the medicinals administered by aerosol therapy and the utilization of a liquefied gas as the propellant for a medicinal aerosol. Such aerosols should be accepted readily by both physician and patient.

Atomizers have been on the medical scene for nearly one hundred years. Bergson, a German physician, developed a cumbersome atomizer in 1860 which used steam pressure as the method of force and suction. In 1865, Clark, a London practitioner, improved upon Bergson's model by substituting a rubber bladder as a source of pressure. In the United States in 1888, De Vilbiss combined his talents as physician-inventor and advanced the earlier work of Bergson and Clark by devising a medicinal atomizer that became the basic model for the atomizer as it is today.

In 1908 Saenger (1) obtained a patent for a simple atomizer for medicinal use. This principle was utilized by Fusch (2) and in 1909 U. S. Patent #928,038 gave rise to one of the earliest types of aerosol generators. In order for Fusch to secure a suspension of a finely divided solid medicament, such as sodium chloride in air, for inhalation, he heated a solution of the substance under pressure to a tempera-

ture sufficiently above its boiling point so that when released through a suitable atomizer the moisture of the solution was evaporated. In 1911, Fellerer (3) and in 1915, Muller (4) also patented devices for atomizing medicinal liquids.

Many drugs are absorbed most rapidly from mucosal cells by inhalation. Inhalation therapy is prompt; contact with the blood through the alveolar membrane is abundant. With very volatile substances inhalation approaches intravenous therapy in rapidity of action. An aerosol of penicillin prepared by nebulizing a solution of penicillin has been found to be useful in the treatment of pulmonary infections, chronic and acute (5). Segal, Levinson and Miller (6) in 1947 showed penicillin aerosol therapy to be of value in the management of bronchopulmonary disease caused by penicillin-sensitive organisms. This type administration of penicillin has been shown to be effective as an adjunct in the treatment of pneumonia. Penicillin dusts administered by inhalation have likewise been employed with success in treating a variety of upper respiratory tract infections (7).

A suspension of epinephrine in oil has been used as a means of prolonging the action of the drug in bronchial asthma (8). Klinefelter (9) developed the use of epinephrine sprays for the treatment of bronchial asthma. The official solution of one per cent of epinephrine hydrochloride is used in a suitable nebulizer. The mouth is opened wide and the solution sprayed into the throat. Excellent bronchiolar relaxation results promptly. It avoids the necessity of a parenteral injection. The success of this procedure is dependent largely upon the efficacy of the nebulizer in producing the aerosol of the epinephrine solution (5). (An aerosol product — the Medihaler — has recently been placed on the market to apply epinephrine efficiently).

Pharmacologic studies on man and animals indicate that aerosols (even of solutions many times more dilute than those used for histological studies) may reach the pulmonary depths and act almost immediately. For example, even a few breaths of a stable aerosol dispersed from a one per cent solution of aleudrine, cocaine, procaine, lobeline, or picrotoxin, taken by a human subject, can cause an immediate increase in lung volume exceeding one liter without producing systemic efforts (10, 11, 12). This indicates that the dispersed dilator solution must almost immediately have reached and caused dilation of areas beyond the small bronchi throughout the lungs. When properly dispersed, aerosols of histamine or pilocarpine may cause fatal asphyxia in less than one minute. In dogs of 15 kg. to 25 kg. body weight inhalation for two to four minutes of an aerosol from a one per cent carbaminoylcholine solution produces an acute bronchospasm which may be relaxed within one minute by the inhalation of a one per cent atropine aerosol (10, 13). Injection of carbaminoylcholine produces in dogs a severe and prolonged bronchospasm which is relieved in less than thirty seconds by the inhalation of an ephedrine aerosol (10, 14). It is thus clear that appropriate aerosols may reach almost instantaneously the regions of the lungs responsible for acute asphyxiation, that is, the deepest part of the respiratory tract.

A number of papers recently have dealt with the particle size most suitable for therapeutic purposes. Bryson (10) considers that in practice the efficient mass of the particles is contained in those with a diameter of one micron or more. Of two nebulizers, the De Vilbiss #40 and the Vaponephrin model, the latter appears to him more efficient, for it produces a greater majority of the particles in the 1.5 to 3.0 micron range. Moreover, the Vaponephrin model produces less-scattered large-sized particles than the De Vilbiss #40. Various authors have clearly shown that for ensuring deep penetration into the lungs of the largest quantity of drugs, the micellary size of the aerosol should be below one micron (10).

Pneumodilating agents have been used in aerosol form in cases of lung constriction in asthmatic conditions: epinephrine, ephedrine, benzedrine, neosynephrine, aminophylline, ammonium chloride, procaine, being the most useful (10). These agents have met with a great deal of success.

Ever since its discovery penicillin has been administered in aerosols with incontestable success in cases of pulmonary infections and in treatment of asthma. It is most valuable in cases of asthma complicated by infection. Streptomycin has also been used in aerosol form against pertussis, bronchiectasis, tuberculosis and other pulmonary diseases (10).

Prigal, Morganhesser and McIntyre have obtained the best results with penicillin in asthma cases by combining it with pneumodilating aerosols such as aminophylline and ammonium chloride. It is to be expected that substances more powerfully pneumodilating than these two would have a still more marked adjuvant effect. This was shown by Garthwaite, Barach, Levinson, and Rader who recommend a preparatory inhalation of either adrenaline or neo-synephrine at one per cent. To facilitate penetration of penicillin in asthmatics, the compressed air or

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*The author wishes to express his gratitude to Dr. Albert Matlocks, Professor of Pharmacy at the College of Pharmacy, University of Michigan for his suggestion of this problem and for his valuable aid and assistance during the course of this investigation.

oxygen dispersing the aerosols may be replaced advantageously by a mixture of helium and oxygen. Prigal and his collaborators likewise observed that penicillin dissolved in propylene-glycol checked asthma and pulmonary infections more easily than did penicillin in an aqueous solution (10). They attributed this to the fact that aerosols of propylene-glycol are more stable than aerosols of aqueous solutions.

If a substratum such as substances of large molecular weight which are not readily absorbed by the pulmonary blood (10) is used, it may be expected that the local action of the drugs mixed in such a substratum will be prolonged (15). In this case, however, substances with no pneumo constricting power of their own should be chosen as the substratum. A 3.5 per cent polyvinylpyrrolidone solution has been recommended by Tiffeneau for that purpose (10). Charlier also investigated this compound and found that polyvinylpyrrolidone increases and prolongs pulmonary dilator action (16).

Finally, it is to be emphasized that if the aerosols of penicillin are small-sized, they do not provoke in the patients inhaling them the unpleasant sensation of a sore tongue, as is ordinarily the case with the coarse dispersants furnished by ordinary atomizers (10).

The effectiveness of appropriately dispersed drugs has been proved not only for treating diphtheria, ordinary colds, streptococcic phaygitis, sinusitis, pertussis, bronchitis and bronchiectasis, but also for pneumonia, bronchopneumonia, lung abscesses, pulmonary infection, tuberculosis and hemoptysis (10). Aerosols have been used for the administration of penicillin, streptomycin, and bacitracin, sulfonamides, expectorants, aluminum powder and aluminum hydrate, hormones, salicylates, serums, viruses, antitoxins, antigens, pollen extracts, peptone, histamine, antihistaminics, vaccines, tuberculin, paraminosalicylic acid, metallic salts as specific antiseptics, mineral waters, calcium salts, iron salts, glycols, detergents, and radioactive substances (10, 17).

Aerosols can be used not only for their local pulmonary action but also for their systemic action, because after aerosols of medicinal solutions have been breathed for a certain length of time, the dispersed substance is found in the systemic blood. On man or dog it has been possible to produce rapidly the characteristic action on several bodily functions of: a) Vascoconstrictors (epinephrine, benzedrine); b) Vasodilators (cholinesters, sodium nitrite, diethylaminomethylbenzodiozane); c) Cardiotonics (digitalis, ouabaine, caffeine, epinephrine, benzedrine); d) diuretics of the xanthine series (caffeine, theobromine, diuretin); e) diuretics acting by improvement of the renal circulation (benzedrine, aleudrine, sympatol); f) diuretics acting by blocking the tubular reabsorption (salygran); g) substances causing acidosis (calcium and ammonium chlorides); h) convulsants (strychnine, pervitin); i) central nervous system depressors (barbiturates); j) sensitizers of the orthosympathetic system (benzyl-ester or benzyl-ethyl-methylamine, ariline, benzedrine); k) hormones (pituitrin, insulin); and l) antibiotics (10).

Aerosol application of medicinals offers numerous very definite advantages compared with conventional methods, including ease and speed of application, rapid response, uniform dosage, efficiency of dispersion, etc.

While many drugs have been investigated in aerosol form, only one has been utilized to date as a liquefied gas aerosol. Through the use of liquefied gas propellants the desired particle size can be obtained and the medicinal will be available in a convenient form, making administration easier and more effective. The possibilities are unlimited and once the basic information is obtained concerning problems of accurate dosage, pressure of propellant, stability of product, particle size, solubility of medicament in propellant, etc., it may be possible to formulate any drug into an effective aerosol.

As has been stated, the effect of medicaments in aerosol form is largely dependent upon particle size or droplet size; therefore, in order for an aerosol to be effective, the size of the discharged particles must be controlled. The particles must be of uniform as well as of a definite size. For example, the particle size of aerosols intended for application to the lungs must be of such size that they will be small enough to pass through the nasal cavities, pharynx, larynx, and trachea, yet large enough so that they will be deposited on the lung tissue instead of passing right on through. Particle size can be controlled by varying the (a) pressure, (b) design of valve, and (c) concentration and type of propellant.

In the formulation of medicinal aerosols, pressure will of course be an important consideration, because pressure determines to a considerable extent the nature of the spray. Discharges ranging from a liquid stream to a fine mist can be produced by changing the pressure. The rate at which the contents of the container will be discharged also is affected directly by the pressure. While pressure is of primary importance, other factors such as design of the valve and concentration of the non-volatile components also influence the character and effectiveness of any aerosol product. Vapor pressure of the propellant, also, is an extremely important consideration and must be adjusted for the particular product being dispensed.

Aerosols of the two-phase and foam types have of course been used widely and successfully for many products for external use. Consideration of the use of aerosols internally, however, for the application of medicinals, poses quite another set

of questions. If such products are sprayed into the nose or throat, is there a possibility that some of the propellant may reach the lungs, with resultant unfavorable effects? While the propellants in common use are relatively non-toxic and non-irritating when used externally, very little is known about their toxicity when ingested (19).

Studies are now in progress by propellant manufacturers in an attempt to determine the possible toxicity of the various propellants when taken internally. It will be wise to await the results of these investigations before making any decision. Meanwhile, it is encouraging to learn that the U. S. Food and Drug Administration has already approved the spraying of a propellant product into the mouth.

Preliminary experiments indicate that the three-phase type aerosols may also show promise as a means of applying medicinals in aerosol form. It is believed that three-phase aerosols can be used medicinally. Before this can be established, however, further studies must be made which will include the following:

1. A study of the solubility of various drugs in the solvent and liquefied gas.
2. Determination of the stability of the drugs in solvent-propellant mixtures which have given satisfactory solubility results.
3. Determination of optimum pressures of combined solvent and propellant for obtaining particles of proper size.
4. Investigation of control of particle size and pressure of flow of the aerosol by use of specially designed aerosol valves.
5. Investigation of control of dosage of aerosol through specially designed valves.
6. Design of inexpensive, portable containers suitable for marketing the finished aerosols.
7. Biological tests to verify previously published values for size of particles most readily absorbed and to verify control of dosage. Results of these tests may suggest some changes in the aerosol package.

Summary and Conclusions

MANY medicinal drugs have proved to be more effective when applied as a spray or mist than when applied by other methods. Therefore, thought has been given to the possibility of utilizing the aerosol principle for the dispensing of medicinal products. It may be possible to extend the use of aerosol products not only to medicinal products for external use but also to medicinal products which can be applied locally to the mucous membranes and to other tissues of the body. Such products would include nasal, throat, and ear sprays, vaginal and rectal sprays, antiseptic sprays and sprays for antibiotic therapy. It is highly possible that the antibiotics can be utilized in a similar manner, especially in cases where a high concentration of the antibiotic is required over a limited area. Such is the case in the treatment of pulmonary tuberculosis with streptomycin. This may also provide an acceptable method for administration of atropine as an antidote for poisonous nerve gases during war time, as well as offering a solution to finding an alternate method for the administration of insulin.

Medicinal products packaged in aerosol form would possess the following advantages:

a) ease of application
b) speed of application
c) efficiency of dispersion
d) no possible contamination of product with foreign materials
e) direct local application
f) uniform dosage
g) possibility of obtaining a high concentration of drug over a limited area
h) almost instantaneous response to the medication
i) less danger of decomposition of the medication since it does not pass through the gastro-intestinal tract.

The possible applications for medicinal aerosols are unlimited. It has been the purpose of this research to investigate some of these possibilities with the hope of suggesting usable products, as well as to investigate some of the fundamental properties underlying aerosol formulation.

Finally, it is hoped that this research will result in a method of giving therapeutic agents, in controlled dosage, through the lungs where rapid absorption, painless administration, or high concentration in lung tissue is important.★

C.S.M.A. Proceedings

Official proceedings of the 42nd annual meeting of the Chemical Specialties Mfrs. Assn., held Dec. 6-7, 1955, in New York, are available from the association at $7.50 per copy, or $8.00 outside the U.S.A.

Proceedings of the 42nd mid-year meeting held in Chicago, May 20-22, are now being prepared for publication and probably will be ready for distribution early in September. C.S.M.A. offices are located at 50 E. 41st St., New York City.

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Production Quality Control

The Chicago plant of G. Barr and Co., which houses production and laboratory facilities, as well as headquarters of this coast-to-coast aerosol manufacturing company.

The Bronx, New York, plant geared for aerosol production to serve Eastern market. Chicago and Los Angeles plants take care of Midwestern and West Coast needs.

The new Los Angeles installation, is a modern one-story building constructed of red brick and glass block. As in Barr's other two plants the West Coast addition includes equipment for both refrigerated and pressure filling as well as its own quality control laboratory.

by Robert Garty
Staff

AMERICAN industry over the years most certainly can count hundreds, literally thousands of successful businesses, that starting from nothing more than an idea, grew in time to become giants in their respective fields. Few, however, can boast more than one success in the short span of 21 years. Unique among this select group is G. Barr and Co., Chicago-headquartered private label packager of aerosol products.

The firm had its beginning in the fall of 1935 when George Barr, a recent graduate of the University of Wisconsin, decided that the private

Key to Coast-to-Coast Operations at G.BARR

George Barr (far right), president of G. Barr and Co., with the company's three plant managers at their periodic production coordination meeting. Left to right: Robert G. Appenzeller, manager of the Chicago plant; Gerald G. Foster, Los Angeles plant manager; Rud Saacke, who manages the Bronx plant, and Barr.

label packaging industry would, after it awoke from its post-depression hangover, enjoy a re-birth and very rapid growth.

Having a background in chemistry, it was natural for Mr. Barr to direct the efforts of his new firm exclusively to the packaging of chemical specialty products for the chemical and drug industries. A chemist by profession, a production man by instinct, he soon had his plant running at capacity, and by 1949 was doing a $5,000,000 annual business.

About this same time the infant aerosol industry was enjoying its initial success in converting the cumbersome and expensive "bug bomb" of World War II to a more convenient and compact unit. The promise of aerosols caused Barr to make a major business decision. So convinced was he that the potential growth of the aerosol industry would be almost unlimited, that he immediately began to lay plans involving the complete conversion of his plant from general chemical specialties, to the packaging of aerosol specialty products. The big decision paid off handsomely, for G. Barr and Co. today package 1,000,000 units a week in their Chicago plant alone. Branch plants in New York City and Los Angeles each swell production by 250,000 units a week.

From the beginning it was obvious to Barr that success and stature in the aerosol industry would be dependent on technical sure-footedness. "A complete aerosol packaging service," says Mr. Barr, "is one that combines the know-how of the mechanics of pressurized packaging with the techniques of the chemistry of pressurized packaging."

Barr's doggedness on service is exemplified by the very geography of the company. Location of the three plants in Chicago, New York, and Los Angeles puts manufacturing facilities right in the major market areas. This means that customers' shipping costs can be cut significantly. For example, a New York aerosol packager can have his product filled simultaneously in New York, Chicago and Los Angeles and shipped directly from these plants to local distribution points. Barr, who coordinates the management of all three plants from his Chicago office, believes firmly that the simplification of shipping problems results in savings in time as well as in money. Deliveries can be up-dated when cross-country shipment is avoided by the strategic placement of production facilities.

Believing from the beginning that the "complete service" approach was the only basis on which to build the company's new enterprise, Barr searched for the most competent personnel he could find, a search which he still continues, to keep pace with the rapid growth and diversification of the aerosol industry. Whether in production, management, sales or laboratory, Barr's company is staffed with individuals markedly qualified for their respective jobs.

The permeating business philosophy that substantial know-how is the unbeatable sales technique is evidenced in every phase of the company's operations.

Barr's laboratory is staffed by a tcehnical director, assisted by 12 chemists and a laboratory technician. This department operates in two principal areas.

First, it attends to the constant chemical analysis of products running through production to insure that manufacturers' specifications are accurately met on every batch of material packaged. A production run involving 100,000 units may have 50 or more units pulled off the line at irregular intervals and sent to the technical department for chemical quality control check.

After exhaustive quality checks have been made, the technical department approves a lot for shipment, and four units are stored away for "shelf life" testing. At intervals of 6, 12, and 18 months, the product is inspected and analyzed for stability of the formulation, and the container and valve are checked for corrosion and leakage. After a period of four years the remaining unit is given the same inspection and analysis. Any changes discovered during the shelf test period that affect product quality are made known to the manufacturer, who in conjunction with the technical staff work out necessary corrections in formulation or packaging.

The second, but equally important function of the technical staff involves research on projects to improve existing aerosol products and the development of new ones.

Barr believes that only through continual appraising of and research on such problems as ingredient formulations, propellant-product compatibility, container corrosion, toxicity and spray pattern characteristics, can existing aerosols be improved and new ones developed to the point where better, less expensive merchandise can be offered the consumer.

To the technical staff also falls the important task of determining the practicability of converting a currently marketed product from its present form to that of an aerosol product. According to Morris J. Root, technical director, the problems of conversion are in many cases innumerable. More likely than not, the entire product ingredient structure has to be changed to accommodate problems that may arise as a result of propellant-ingredient incompatibility or container corrosion.

Testing to determine eye irritation by spraying aerosol film anti-perspirant into a rabbit's eyes is an example of research done in a biological consulting laboratory for G. Barr and Co.

Since a sensitive valve mechanism is used to discharge the product, reformulation may be necessary to provide a fluid that will not clog or unseat the valve.

Important consideration must often be given to toxicity of a particular ingredient or to the product as a whole, particularly those products intended for personal use. Since aerosol products are sprayed over a relatively wide area, toxicity to certain parts of the body may prove a problem not related to formulations applied directly to a given area.

The technical problems as well as the economics of formulating a product for aerosol packaging all must be solved before a product is, from at least the laboratory and production standpoints, market-ready. It was this constant evaluation of products that led the Barr organization into still another area of the industry, the development of new aerosol products and the manufacture of same for distributors. A recent development of this type was the successful formulation of an aerosol anti-perspirant. The entire formulation had to be changed and new ingredients found or developed before the entire anti-perspirant became both practical and economical in aerosol form.

Regarding the mechanical side of Barr's operation, one of the most elaborate production quality control systems found anywhere in the aerosol industry is employed in each plant. Each production line has seven stationary inspectors and one inspection foreman, who constantly check the units at various stages of filling and packaging. Inspection findings are coordinated statistically on complex printed forms, so that a technical "production picture" is made of every run. Accuracy of fill weights, damaged or leaking containers and valves, and improperly labelled units are among the factors systematically watched, with defective units of course being removed from the line. In all, each unit must pass approximately 65 different inspections before it is released for shipment to the customer.

If any defect should be the result of faulty mechanical equipment or machine failure, a crew of engineers and machinists, working on a three-shift basis, are on-the-spot to repair or replace equipment and keep lines moving with a minimum loss of production time. Because of this on-the-spot maintenance, as well as a program of planned overhaul and repair at periodic intervals, Barr production lines enjoy a production efficiency of well over 90%. Barr engineers constantly improve, design and construct special features for their equipment to boost production capacity and help maintain an ever increasing schedule, while at the same time insuring every-day production of quality products.

From the receipt of raw materials, to the shipping of finished goods, the Barr plant is a marvel of automation. Five propellant storage tanks, each with a capacity of a standard railroad tank car, can accommodate a total of

300,000 pounds. High pressure pumps are installed on each tank, forcing a constant supply of propellant from the storage area to third floor refrigerating equipment. Compounding of concentrates is also done on the upper floors, from which the concentrates are then gravity fed to refrigerated stainless steel tanks.

Valves and containers, stored literally by the millions in warehouse areas are fed to each production line by conveyor belts. Containers, when filled, are transported rapidly from production lines located on one floor to labelling and shipping departments, one floor above, by means of a magnetic conveyor that holds containers firmly in place as they ascend at a 45 degree angle. Everywhere one looks, material and finished products are moving from one production area to another, and arriving systematically at the right place at the right time.

With three plants now in operation and producing 1,500,000 units a week, still more capacity will soon be needed. In order to meet this need, a fourth plant to be located on the Gulf Coast is currently being planned. With a Gulf Coast location, Barr feels that not only will added production capacity be realized, but the plant will also serve as a ready point for Barr customers in the growing Southwestern consumer market.

When asked about the future of the aerosol industry, George Barr becomes very serious and frankly admits that "I have no idea at all just how big it soon will become. But, grow it will, and no matter in what area the next big expansion takes place, pharmaceuticals, food, or one yet unthought of, you can be assured that G. Barr and Company will be there waiting for it." ★★

CSMA Board Meeting Sept. 24

The Board of Governors of the Chemical Specialties Manufacturers Association will meet Sept. 24-26 at the Oyster Harbors Club, Osterville, Mass. The various administrative committees, including the Aerosol Administrative Committee will also hold meetings at the same time as the Board of Governors.

Du Pont Offers New Propellant Numbering System

THE Du Pont Company recently offered to make generally available a simplified numbering system, developed over the last quarter century, to identify chemical compounds used as aerosol propellants and refrigerants.

Acceptance of the proposal, made initially to The American Society of Refrigerating Engineers, is expected to reduce confusion existing in the aerosol and refrigeration industries due to similarity of fluorinated halohydrocarbons. It is suggested that a common numbering system would substantially simplify equipment designers' and manufacturers' work. The proposal already has been accepted by the Standards Committee and Council of The American Society of Refrigerating Engineers and will be incorporated into an ASRE Standard on Refrigerant Designation for future approval by the general membership of that scientific group.

Specifically, Du Pont has announced that it will not look upon use of the generic term "refrigerant" followed by code numbers based on Du Pont's numbering system to constitute infringement of its trademarks. Such trademarks consist of a combination of "Freon" or the letter "F" with numbers such as: "Freon-11," "F-11," "Freon-22," "F-22," etc.

The numbering system, based upon the chemical structure of compounds used as refrigerants, was first developed by "Kinetic" Chemicals, Inc., then a jointly owned subsidiary of Du Pont and General Motors Corporation, in 1930. The first of the family of "Freon" fluorinated or halohydrocarbon compounds had just been introduced to replace more toxic, flammable, or explosive chemicals then used as cooling agents. Refrigerants of the type of "Freon" are credited with making mechanical refrigerators, freezers, and air conditioning systems more completely practical from a public safety standpoint. In recent years adoption of the same liquefied gases as propellants for use by the aerosol industry has been widespread.

Until 1952, "Kinetic" Chemicals, which became a division of Du Pont's Organic Chemicals Department in 1950, was the only U. S. manufacturer of fluorinated hydrocarbons. In the early 1950's the General Chemical Division of Allied Chemical and Dye Corporation entered the field with its "Genetron" fluorinated hydrocarbon products. Pennsylvania Salt Manufacturing Company later this year will introduce a third brand of fluorinated hydrocarbon compounds, under the trademark "Isotron."

—Convention Calendar—

National Supermarket Non-Food Exhibit, *New York Coliseum, New York City*.....Sept. 10-13

Packaging Institute, 18th Annual Forum, *Statler Hotel, Cleveland*.....Sept. 11-14

Packaging Assn. of Canada, Workshop Seminar on Package Design, *Sheraton Mount Royal Hotel, Montreal*.....Sept. 20

Fragrance Foundation, *Savoy-Plaza Hotel, New York*.....Sept. 20

Pharmaceutical Council of Greater N. Y., 9th Annual Cosmetic and Sundry Show, *Hotel Statler, N. Y.*.....Sept. 23-25

CSMA, Board of Directors Meeting, and Meeting of the Aerosol Administrative Committee, *Oyster Harbors Club, Osterville, Mass.*.....Sept. 24-26

Packaging Machinery Mfrs. Institute, annual meeting, Skytop, Pa.....Oct. 5-8

National Chemical Exposition, *Public Auditorium, Cleveland, Ohio*.....Nov. 27-30

Chemical Specialties Manufacturers Association, *Mayflower Hotel, Washington, D. C.*.....Dec. 3-5

American Pharmaceutical Mfrs. Assn., Mid-Year and Eastern Section Meetings, *Waldorf-Astoria, New York*.....Dec. 10-12

National Packaging Exposition, International Amphitheatre, Chicago April 8-11, 1957

Chemical Specialties Manufacturers Association, *Drake Hotel, Chicago, Ill.*.....May 20-22, 1957

1 **Aerosol Packaging Increases Number of Users!**

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From retail stores across America comes the answer to why so many "sleeper" products suddenly are best sellers when packaged as aerosols: *they get a four-way sales boost!*

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Here's what they are saying:

"Our new aerosol cologne is being used in ways and by people we could never sell before," one enthusiastic manufacturer reported.

"There's less time between repeat purchases" said another. "Women use our aerosol package more often than they used the same product in liquid form," a third reported.

All this means just one thing to smart marketers—you're missing today's best bet for stimulating sales if you haven't considered aerosol packaging for your product. Last year's 240-million-unit aerosol sales are proof of that.

*Conducted by a leading drug and cosmetic trade magazine

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If you want technical guidance in developing the right propellant and formulation for your product, see General Chemical. If you want information on aerosol containers, valves, packaging equipment, contract fillers, you can get it from General Chemical. As the producer of "Genetron" propellants, we have the specialized experience and the research and testing facilities to help you find the right answers to your problems.

And, you don't have to invest a cent in special equipment or personnel to enter the profitable aerosol market. There are contract fillers near you who will take over the entire job for you quickly, economically.

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Interested? Then send today for illustrated booklet packed with fast facts on how to market your products as aerosols: "How to Push Up Profits With Aerosols." Write to:

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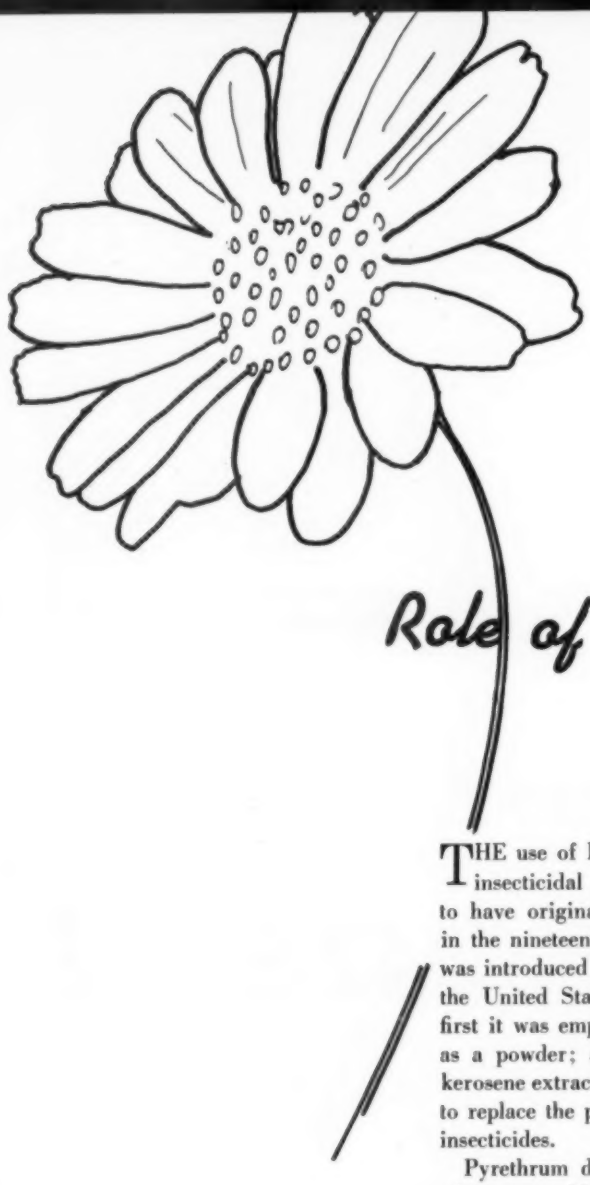

Role of PYRETHRUM in

THE use of Pyrethrum flowers for insecticidal purposes is believed to have originated in Persia. Early in the nineteenth century Pyrethrum was introduced into Europe, and into the United States around 1860. At first it was employed almost entirely as a powder; about 1919, however, kerosene extracts of Pyrethrum began to replace the powders for household insecticides.

Pyrethrum derives from a flower, which resembles our common field daisy. Actually, Pyrethrum is regarded as a section of the genus Chrysanthemum of the family Compositae; of this genus, only the species *Chrysanthemum* cinerariaefolium is of any commercial importance.

Pyrethrum used in the United States comes primarily from British East Africa and the Belgian Congo. Minor quantities are imported from Japan, Yugoslavia and Brazil. However, most of the output of these countries is kept at home for use in their own domestic markets. Incidentally, about two-thirds of the African production of Pyrethrum is used by the United States.

Pyrethrins (the main active ingredient of Pyrethrum), were utilized in the first insecticidal aerosol bomb produced. This original product contained 1.0% Pyrethrins and 2% Refined Sesame Oil with 93% Freon #12 as the propellant. The first aerosol bombs were packed at a pressure of 70 to 80 lbs. per square inch.

With the later development of the lighter weight 30 to 40 pound beer can type containers (non-refillable), the aerosol market experienced a sharp and continuing increase in quantity of insecticide sold.

It has been estimated, incidentally, that Pyrethrum is used in 90% of all insecticide aerosol packages.

Why and how does Pyrethrum play such an important role in the Insecticide Industry?

Pyrethrum is unique for many reasons: First of all it is highly toxic to insects, while at the same time being non-toxic to warm blooded animals. It has a highly paralytic effect against insects, resulting in a fast knockdown. A third advantage, which is growing in importance, is the ability of Pyrethrum to control resistant strains of insects.

Since Pyrethrum does have all the above properties, it can be considered as an all-purpose insecticide, and has

TABLE A

EFFECTIVENESS OF DDT IN LOW PRESSURE AEROSOLS WHEN ADDED TO PYRETHRUM AGAINST HOUSE FLIES IN A STANDARD PEET-GRADY CHAMBER.

Material	% Knockdown 5 min.	10 min.	15 min.	% Kill 24 Hours of KD flies
0.4% Pyrethrins	42.1	51.3	65.4	48.6
0.4% Pyrethrins & 2% DDT	44.0	52.3	66.8	66.8

Aerosol Insecticides

By Robert D. Sharp

Prentiss Drug & Chemical Co.
New York City

received universal acceptance for use in household aerosol formulations. However, in order to secure a prolonged knockdown, and high kill, it is, of course, advisable to add other toxicants to the formulation.

One such group of materials is the chlorinated hydrocarbons, of which DDT is the foremost. The data in Table A illustrate clearly that the addition of 2% DDT to Pyrethrum in an aerosol insecticide formula can successfully produce 100% mortality of knockdown flies.

Because of the high cost of Pyrethrum, the use of one of the several synergists, such as Piperonyl Butoxide, Sesamin, MGK "264" or Sulfoxide is suggested. In this way the amount of Pyrethrum may be reduced considerably, resulting in a lower cost formulation, while at the same time there is no loss in the high rate of efficiency. Of the above mentioned synergists, probably the most efficient, and best on the market today, is Piperonyl Butoxide. Not only does it synergize excellently with Pyrethrum, but it also has some insecticidal activity of its own, which adds to the mortality and knockdown. (See Table B.) below.

We mentioned previously that there are resistant strains of insects. Probably the one which causes the most concern is the housefly. The inability of DDT and the other chlorinated hydrocarbons to control this insect has confronted entomologists and insecticide manufacturers with many serious problems. Here again Pyrethrum plays an important role. With the elimination of DDT from the formulation, we must increase the amount of Pyrethrum and synergist, which results in a higher cost formulation. However, by using Pyrethrum, not only are we able to control resistant houseflies, but also we have a relatively non-poisonous formulation which can be used in practically all locations.

Table C gives a typical Pyrethrum-Piperonyl Butoxide formula, in comparison with the Official Test Aerosol, which contains Pyrethrins 0.4% and DDT 2%.

(*Turn to Page* 53)

TABLE B

EFFECTIVENSS OF PIPERONYL BUTOXIDE WITH PYRETHRINS AND DDT IN LOW PRESSURE AEROSOLS AGAINST HOUSEFLIES IN A STANDARD PEET-GRADY CHAMBER.

Material	% Knockdown 5 min.	10 min.	15 min.	% Kill 24 Hours
0.4% Pyrethrins	....	....	....	....
...%	....	....	....	....
2% DDT	44.0	52.3	66.8	66.8
0.15% Pyrethrins	....	....	....	....
1.2% Piperonyl Butoxide....	....	....	....	....
...%	....	....	....	....
2% DDT	49.7	76.3	87.1	87.1

TABLE C

EFFECTIVENESS OF PYRETHRUM AND PIPERONYL BUTOXIDE ALONE AGAINST HOUSEFLIES IN A STANDARD PEET-GRADY CHAMBER.

Material	% Knockdown 5 min.	10 min.	15 min.	% Kill 24 Hours
0.25% Pyrethrins	....	....	....	....
2.0% Piperonyl Butoxide....	65.9	85.3	89.6	88.1
TOTAL	44.0	52.3	66.8	66.8

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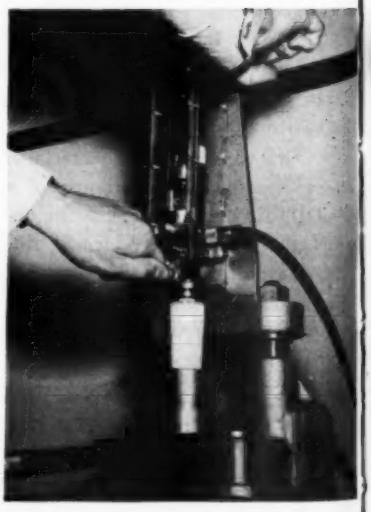

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TREET, NEW YORK 19, NEW YORK

THREE PHASE AEROSOLS

Just how good are three-phase aerosols? For what are they best suited? What are their future possibilities?

To find answers to these questions and others, Donald Davis of the *Aerosol Age* staff interviewed Dr. Francis A. Mina, vice-president and general manager of E. A. Bromund Co., New York, refiners and bleachers of beeswax. The company is a subsidiary of the Chemway Co., New Brunswick, N. J., formerly Zonite Products Corp. Dr. Mina directed the development of the three-phase aerosols in which a heavier-than-water propellant is used. His remarks have supplied the basis for this article.

WITH the development of three-phase aerosols over the past few years, it appears that a vast field of possibilities for new aerosol products has been opened up. Restrictions on types of containers used, possibilities of propellants reacting chemically with the product, and general difficulties in dealing with high pressures, have been substantially reduced with this lower-pressure system of packaging aerosol products its developers say. Just as low and medium pressure aerosols seemed such an improvement on the old very-high pressure "bomb" type aerosol, so the three-phase ultra-low pressure system is claimed by its proponents to be an improvement on conventional type aerosols for many applications.

The basic difference between conventional aerosols and the three-phase system (with the heavier-than-water propellant) is that the propellant being practically insoluble in a water-base product remains at the bottom of the container as a reserve pool. As the volume is reduced through consumption of the product, there is a corresponding pressure reduction in the head space to maintain pressure constant until the product is used up.

Since the three-phase system requires less than five per cent propellant for the complete package, and the cost of the propellant in conventional aerosols is a very high percentage of the cost of the product, the saving here is considerable. In the heavier-than-water three-phase system, Genetron 320 or Freon 114, either alone or in combination with small amounts of Genetron or Freon 12 are suggested. Though propellants Freon or Genetron 11 also can be added, it was found that far too rapid hydrolysis of these gases occurred for use with the water-base products generally propelled from the three-phase aerosol.

With the correct selection of propellant in the three-phase system, pressures developing within the package can be controlled easily. At 70°F. the pressure is 13 to 15 p.s.i.g., with an increase in pressure to only 59 pounds at 130° when dichlorodifluoromethane is used as the propellant. In the majority of the two-phase products already on the market, the pressure is upwards of 35 p.s.i.g. at 70°F. This considerable pressure dictates the use of metal containers, often with pronounced arching top and bottom. Because of the comparatively high pressure employed in the conventional system, fillers have normally been limited to metal containers in accordance with ICC regulations, which restrict the packaging of aerosols having pressures in excess of 25 p.s.i.g. at 70° to metal containers. The three-phase method, with its uitra low pressure has made possible the use of uncoated or lightly coated glass containers, and a variety of light plastics, thus opening up a vast new field of container possibilities.

Glass, as a container for most common liquids, presents no corrosion problem. Neither does it normally react chemically with most pharmaceuticals and perfume ingredients. It is the ideal container for water-base products. Manufacturers of two-phase aerosols must strive to extract every last drop of moisture from their product (to reduce corrosion possibilities), but packagers of water-base products in the three-phase system have few problems on this score.

Dr. Mina's firm, Chemway Corp., was first presented with the problem of developing an ultra-low pressure system when they undertook to adapt "Larvex," their moth-proofing spray, to an aerosol package. Since Larvex is acidic in nature, and a water-base product, it could not be readily adapted for packaging in the conventional metal container. And while the containers could be coated with corrosion resistor, it was discovered that such coatings didn't last as long as was necessary. The obvious solution was glass, but the existing system presented far too difficult a pressure problem with even reinforced glass. The solution was the development of a new system of propulsion, this one involving much lower pressures.

Early last year U. S. patents were granted covering the three-phase system and the use of "boilstone activators." The purpose of "boilstones" in the three-phase system is to insure a steady pressure build-up for products intended for continuous spraying.

Here again, another problem was presented. The conventional two-phase valves were not adaptable to the new system because, under the lower pressure generated, they delivered a stream of liquid rather than the preferred spray. Dr. Mina and his associates had to develop a more finely constructed valve to deliver the spray, and were granted a patent on this valve (U.S. Patent 2,702,957).

To meet existing safety standards, intensive tests were conducted at the laboratory of the Association of American Railroads. Various types of "drop tests" were conducted and recorded, and a case of the product was even submitted to a fire test to determine explosive characteristics. To the surprise of the testers, the heat of the flames caused a melting of the plastic valves and a quick loss of the product, with a sudden extinguishing of the flames! The safety tests indicated that the safest protectant for Larvex's glass container was a specially designed fiberboard case, rather than any type of glass coating. In 1952 "Larvex Fingertip Spray" was introduced as the first glass aerosol.

Since its success with Larvex, Chemway has introduced another successful three-phase aerosol in a glass container, and has licensed several more. "Myna," a glass cleaner, was first introduced in 1953 on a test marketing basis, and has since been placed on the national market.

about Dr. Francis Mina

Dr. Francis A. Mina is a pioneer in the field of three-phase aerosol research, and holds some of the first patents on the three-phase system employing heavier-than-water propellants. He graduated from Fordham with a B.S. in 1942, an M.S. in 1944, and a Ph.D. in 1947, holding a teaching fellowship from '42 to '46.

Dr. Mina joined Zonite Products as a research chemist in 1946, rising to the post of technical director in 1952. It was during this term as technical director that he perfected three-phase aerosols. When Zonite became Chemway Products Dr. Mina continued as technical director of Chemway, and when Chemway recently took over E. A. Bromund Co. he was made vice-president and general manager of that subsidiary. He is a member of the ACS, the Chemists Club, and several other national societies.

How about further possibilities for the three-phase system?

Dr. Mina sees several outstanding possibilities for his ultra-low pressure system, particularly in the relatively unexplored field of aqueous-base pharmaceuticals and perfumes. In his tests he found that products containing high proportions of propellant, as are produced in the conventional system, impart an excessive cooling to delicate tissues and membranes, particularly in the case of burns. In the three-phase system, such supercooling effect is non-existent, since the propellant remains in the container at all times and 100 per cent product is sprayed. This would seem to indicate superior results with most medicinals, antiseptics, and other pharmaceuticals, when applied with the lower-pressure system, he believes. Especially where the drug to be dispensed is readily soluble and stable in water, the three-phase system rather than the conventional one would seem to be indicated.

As a matter of fact, in all types of aqueous-base products, the three-phase system will in the future have to receive prime consideration as a possibility for aerosol packaging.★

What's Wrong With Fire Extinguishers?

SOME rather critical comments on fire extinguishers were made in a talk by Acting Chief Edward N. Montgomery of the Boston Fire Department before the 60th annual meeting of the National Fire Protection Association. While Chief Montgomery did not specifically mention aerosol type fire extinguishers in his address, "What's Wrong with Fire Extinguishers", his observations were clearly meant to apply to all extinguishers inadequate in capacity to do a competent fire protection job.

The speaker noted that many losses are incurred as a result of people failing to call the fire department in time while making futile attempts to fight fires with inadequate extinguishers. He emphasized that there is no extinguisher which will be effective against all types of fires, last forever and still sell at a low price.

He stressed the need of public education. "People should be taught the difference between Class A, B and C fires, how to operate extinguishers, how to maintain them properly and why they should spend $25 or more for a standard extinguisher instead of $1.94".

He suggested that a legal requirement would be desirable to require maintenance contracts providing for periodic reservicing of extinguishers, but admitted that such a requirement would probably be illegal. In the absence of such a provision, he suggested that at least packers of fire extinguishers be required to affix a conspicuous label "Not good after ....." He suggested also that as a method of preventing use of Class B extinguishers on Class A fires it would be helpful to eliminate carbon tetrachloride completely as an extinguishing agent. Many superior extinguishing agents are available, he asserted. Carbon tetrachloride is cheap, of course, but Chief Montgomery observed that "water is cheaper and a lot better for dealing with the average fire."

What is most needed, he said, is some effective way of controlling inadequate, "gyp" products whose effectiveness comes nowhere near matching the claims of their marketers. "The public", he noted, "is spending money for fire safety it does not get to the detriment of attention to real fire protection".

One of the big difficulties in dealing with the situation, said the speaker, is that "all of these Gyppo devices will undoubtedly put out some fire, and who is to say that something is not better than nothing?" . . . "One of our troubles is that there is no clear understanding of just how much fire and what kind of fire an extinguisher should be able to handle to be worthwhile."

He suggested that there should be

(*Continued on Page* 56)

Internal Pressure Testing of Aerosols

This "Method for Determining the Internal Pressure of Aerosol Insecticides and Room Deodorants prepared by the Insecticide Standards Sub Committee of the Scientific Committee of the Chemical Specialties Manufacturers Association, has been approved by the Aerosol Division Administrative Committee of CSMA.

Introduction

TO CONFORM with certain ICC Regulations, low pressure aerosol formulations of insecticides and room deodorants (20% nonvolatiles, or less) must have internal pressures not greater than 40 psig. at 70°F. Pressure measurements also provide a rapid, though rough, method for checking on filling ratios and filling procedures. Abnormally high pressures may indicate faulty evacuation of cans before pressure filling and the presence of trapped air resulting from below normal propellant temperatures during refrigeration filling.

Many methods of varying degrees of complexity have been devised to determine pressures. All are time consuming and do not lend themselves to mass production. In general, pressures taken to the nearest pound are considered sufficient for most purposes.

Because pressure is a function of temperature, it is very important that the contents of the can reach the standard working temperature of 70°F. A constant temperature water bath with suitable agitation is the best method of meeting this requirement. The samples to be measured require a minimum of 15 minutes in the bath before testing.

The measuring system should be constructed in such a way that the pressure is determined through the dispenser valve and does not require destruction of the dispenser. The system is prepressurized with nitrogen or other suitable gas.

The dispenser may be in either an upright or inverted position during measurement of the pressure. Three shut-off valves are located in the measuring system. One is positioned immediately below the gage. Below this valve is a tee with the opening to the outside controlled by the second valve. This opening is for prepressurizing and for cleaning out the line back to the valve block by sweeping with compressed air or gas. The third valve is in the line preceding the valve block and is also used to prepressurize the system.

Apparatus

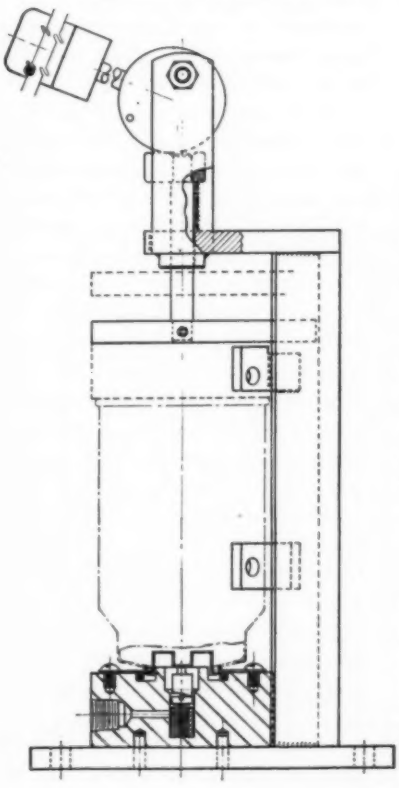
1. A four-inch laboratory test gage, 1-100 psi. range, graduated in one-half pound subdivisions.
2. A jig with valve block for holding the dispenser and which will activate the valve when clamped into position. The valve block has an "O" ring which effects a seal against the outside of the one-inch valve cup of the dispenser and will accommodate most valves. A special valve block may be required in certain cases. Exchangeable valve depressing pins of various lengths and shapes complete the apparatus. The hook-up between valve block and gage (see diagram) is as follows: ⅛" Hoke valve, ⅛" diameter tubing, gage block, ⅛" pipe of sufficient length to allow the gage to be positioned above the surface of the water bath, ⅛" tee, ⅛" Hoke valve and gage. Reducers and connectors for pipe and tubing are used where necessary. The exhaust end of the tee is controlled by another ⅛" Hoke valve. The internal volume of the ⅛" pipe is reduced by inserting a ¼" brass rod. All plumbing should be brass and copper.

3. Constant temperature water bath equipped with stirring apparatus and of sufficient size to hold jig and test dispensers. Bath should be deep enough to allow the dispensers to be entirely surrounded with at least one inch of water. This will require a screen or perforated shelf above the floor of the bath. The bath should be 70° + 0.5°F. At 70°F. a 1°F. increase in bath temperature raises the pressure of the Official Test Aerosol (OTA) approximately 0.8 psig.

Procedure

1. Fifteen minutes before testing, place dispensers to be measured in 70°F. water bath along with measuring jig which has been prepressurized to 30 psig. and in which a spare dispenser has been clamped. The valve in the block is opened so that pressure in the dispenser is being measured. Use of space dispenser prevents inaccuracies with the first test can, and keeps water out of the jig. Shake cans occasionally to help bring the contents more quickly to the bath temperature.
2. After 15 minutes, remove jig from bath and close valve in the valve block to keep system under pressure. Remove spare container and crack valve block valve just enough to reduce gage reading to the proper starting pressure (30 psig.). Wipe out any liquid that comes out of the valve block during this operation. Quickly remove first can to be tested from the bath with a pair of tongs and wipe off excess water before placing in jig.
3. After can has been clamped in position, open valve block valve, tap gage lightly, and record gage reading. Close valve block and repeat operation for the next can. Replace jig in bath every five minutes.
4. Lines should be blown out periodically. The frequency of cleaning will be governed by the type of formulas encountered, and must be determined by experience. Operation is accomplished by back pressuring through the prepressurizing valve after first isolating the gage by closing the gage valve.

Bond Holder for Pressure Measurement of Aerosols



Discussion

It is suggested that a standard consisting of an accurately-filled dispenser having a similar container and valve as the test samples be used to check the proper functioning of the measuring system. The OTA dispenser would serve satisfactorily to check concave style cans. The standard should be used to start off a series of measurements and be used at regular intervals throughout the series.

The process of prepressurizing should be done in such a way that the nitrogen will purge out the air in the system. If the nitrogen cylinder does not have a regulator, great caution must be exercised to prevent damage to the gage. A vacuum pump may also be used to draw air from the system. Here again care must be taken to prevent bending the pointer and throwing the gage out of calibration. The use of a compound gage is the best solution.

Apparatus for Measuring Pressure of Aerosols

Prepressurizing may be accomplished most conveniently and without chance of injuring the gage by using a dispenser filled with the propellant gases alone in the same proportions as the product being tested.

•

ACS Division in Sept. Meet

The Division of Chemical Marketing and Economics of the American Chemical Society has announced plans to present a two-day symposium on "Chemicals in Food Production" at the Society's national meeting in Atlantic City on Sept. 18 and 19. Hugo Riemer, president of the Nitrogen Division, Allied Chemical & Dye Corp., New York, will be general chairman of the symposium.

In the final one of four half-day sessions, Dr. John H. Foulger, director of medical research, E. I. duPont de Nemours & Co., will discuss the Pure Food and Drug Laws and Dr. Robert P. Parker, American Cyanamid Co., will review "Procedure and Economics of Testing New Drugs."

Pressure Packing Overseas

Aerosol trade in the United Kingdom expanding at a rapid rate, says our overseas correspondent, Dr. Tom C. Clark of Druk-Pak, Ltd., Zurich. 1956 volume may reach nine million. First plastic coated glass aerosols, of excellent quality, slated for early appearance on the UK market.

AFTER a better look we are convinced our earlier estimate of UK aerosol production at 3 million containers for 1955 was very much on the low side. It should have been more like 6 million — and we now believe 1956 volume will easily reach 8 to 9 million. They have all it takes, except the right kind of competition and, as usual for Europe, that is at the retail level.

As might be expected from people who persist in driving on the left-hand side of the road, the British have some unusual numbers for the usual fluorinated hydrocarbons. Nos. 11 and 12 come out, respectively, as 6 and 9, and 114 drops to 33. However, it is the prices, not the numbers which make the real difference. A 50/50 mixture of 11 and 12, delivered, in lots up to 100 tons (long ones, of course) comes to a little over 29 cents US per pound, while 114 is over $1.40 per pound. It is little wonder, as we will note later, there are at present no glass aerosols in the UK market.

In the UK, there is only one propellant producer, International Chemical Industries, and we found, at least on our recent visit to Italy, that they give their export markets a better price break than they do their captive home customers. Despite this obstacle, the fillers all stick by the standard propellants. There are no substitute propellant mixtures being used in the UK today, at least as far as we could determine.

Some time ago, a filler tried methylene chloride but came up with elastomer valve trouble which ended his particular experiments. Propellants are freely available, and the supply is adequate for all future foreseeable demands.

On the container side, there is about a 50/50 split between impact extruded aluminum and seamed tin-plate, with aluminum having the edge. Even from steel people we heard this was primarily due to the sales practices and price policy of a US licensee in the UK trying to maintain his position in both the aluminum and tin-plate container fields. (In Germany, the licensee of the same U. S. company has created precisely the same situation). In the aluminum area, at least, the UK has strong competition, and the 6 ounce two-piece impact-extruded aerosol container is fully competitive with the 5 and 6 ounce three-piece seamed tin-plate aerosol can.

Except at the retail end, it is extremely difficult to get component parts prices. Like their continental colleagues, they still believe in secrets in the UK. We could not get in to see some filling lines. As in Germany, the can is often tied in with the valve and valve with can. Incidentally, not one filler we talked with had any sympathy for this practice. In the 5 and 6 ounce sizes (the most popular), the price for combined can and valve comes to about 12 to 14 cents U. S. We estimated the valve prices at between 6 and 8 cents U. S. and were not contradicted. The 20% duty which the UK imposes on valves acts as a barrier to imports from the States, however, and American valve manufacturers must produce locally for the UK market.

There are no drawn steel aerosol containers in the UK. We visited the plant of one aluminum impact extruder, Universal Metal Products, in Salford/Manchester and saw the largest, most modern aluminum impact extruder we have seen to date. About 40 Herlan presses turn out from 4 to 5 hundred thousand units of cans and tubes per day. Matching this production on the other side are over 30 hydraulic injection moulding presses for plastic screw caps, closures and also large separate parts. Their principal problem is operating space. Plant expansion takes long in the UK. Building costs are high, materials scarce.

In the small size aluminum containers up to 4 ounces they use, reportedly without difficulty, a perfectly flat bottom on the container. We tried the sample we bought at 20,000 feet in a pressurized cabin on the

return flight, and there was no sign of distortion. Some time ago, due to inadequate testing and too much haste, there was some hydrolysis trouble with a lot of hair fixative which had to be withdrawn from the market. But the same filler is still filling a revised formulation in better lacquered aluminum containers for the same cosmetic house, with wide market acceptance of the product. Generally when there are mistakes over here, each side acknowledges its errors and they go on from there — without law-suits. An admirable practice.

Scheduled for September market appearance are the first plastic coated glass aerosols — and they are good. There are four designs of 2 ounce bottles, one new, and the plastic coating is the best we have seen in Europe. There are a variety of colors, all translucent, and the plastic fit is tight, bubble-free. There is no tacky feeling as with some German plastic covers and no feeling of insufficiency as with the French. In fact, what we saw in sample form rivals or exceeds anything we have seen from the US. Also, the leading fillers have apparently decided — how long it will stick remains to be seen — that they will not put any uncoated glass bottles on the market. If they get the right valves, glass bottle aerosols will make the right start in the UK. With their wonderful toilet waters they should have a bright future.

As to the products, there is the usual introductory aerosol line. Not as many different types of products are packed as in Germany or France. Of course, insecticides lead and here they have some good ones. Fortunately, one of the oldest English firms in this field, Cooper, McDougall and Robertson, Berkhamsted/Herts, started in May 1950 with their own homemade cold filling equipment as the first UK filler packaging their own products. Their aerosol subsidiary which does the contract loading is Pressure Aerosols Filling Co. Ltd. at the same address. With three cold lines and one pressure filling line they have a capacity of over 100,000 containers per week and still have difficulty keeping up with the demand. In the UK, the contract loader fares better than his continental counter-part, but there is the same drive by the product manufacturer to load his own products. Unavailability of efficient and reasonably priced filling equipment has held back developments up to this point. However, adequate machinery is now appearing from Germany.

There are the other usual products: hair fixatives, sun-tan oil (the same brand "Spray-Tan" which has been so popular all over the Continent this year despite very little sun), moth-proofers, shaving creams, room deodorizers and a new foam hand-perfume by Helena Rubinstein. As mentioned, more than half the products are in aluminum, 5 to 6 ounce containers. The 12 ounce size, due to price, is a rarity. For industrial purposes we did, however, see a 20 ounce two-piece impact-extruded aluminum can which seems to dominate that market. It is primarily the high retail prices which hold back the surge in the UK development.

For a 5 ounce can of "Blue Grass" in a three-piece tin-plate can with an inexpensive paper label, the Elizabeth Arden product brings $2.44. Hair fixatives in 5 to 6 ounce size retail for $1.50 to $1.70, and shaving soaps for $0.90 to $1.00. The fillers blame the can, valve and propellant manufacturers, the product manufacturers blame the fillers, the wholesalers blame all four of them, plus the Government's purchase tax. Retailers just look sweet, however, and say demand is heavy.

The British purchase tax, which is a percentage tacked on to the wholesaler's price (90% for perfumes and 50% for shaving creams), is a big burden, but the added 40 to 50% tacked on by the retailer is the final burden which will imprison these consumer products in the luxury class unless competition or revised sales practices can lower retail prices. In this price structure, the story on the Continent repeats itself with an exorbitant retail mark-up.

Again we find, all factors considered, that manufacturing costs and manufacturers' prices are in line, but the middlemen's mark-up is too high. The side-show is squalling up the circus and the product manufacturers are caught in a web of their own spinning. In the UK, on cosmetics, they take the manufacturer's cost and multiply by seven. At the resulting prices, British women, who admittedly have the most beautiful natural complexions of any women in the world, could readily decide they do not need aerosol cosmetics.

In UK aerosols, there is nothing startling, revolutionary or new. They have improved on some packages, particularly the coated glass bottle. All the rest has been adopted from other countries, but they go at it in the right way and their market is substantial. By next year, they should have several versions and sizes of the one-piece aluminum can, more fillers, more valves, more products and also probably a production rate double that of 1955. Aerosols have caught on in the UK market as the newest and most modern method of packaging and are there to stay.★

AEROSOL SEMINAR

at 18th Annual Forum

PACKAGING INSTITUTE

Hotel Statler, Cleveland

September 11, 1956

"Aerosols . . . Next Stop, the Pharmaceutical Industry"

Moderator: Richard J. Hennessy
Lederle Laboratories Div.
American Cyanamid Co.

"Aerosols . . . Principles and Scope of Operation"

T. D. Johnson
Kinetic Chemicals Div.
E. I. du Pont de Nemours & Co.

"Pharmaceutical Aerosols from Idea to Product"

Morris Root
G. Barr & Company

Consultant's Corner

By Robert A. Foresman, Jr.

Oven Testing and Its Significance in Prediction of Storage Life

SINCE technology started to make possible new products or new processes for the manufacture of old ones, the query has always arisen: How does the new formulation compare with the old time tried product?

Those concerned have attempted to answer such questions by various accelerated testing procedures. While helpful, these tests have, in many instances, served only to prove that the manipulation of time still lies in the realm of science fiction.

Dry products such as textiles, rubber, paper, paint, etc., have been susceptible in varying degrees to ageing effects by exposure to high humidity, high oxygen atmosphere, ultra violet rays, high temperature, water impact and other types of special environments.

Some of these same techniques have been used in ageing studies of packaged products, but generally the only one possible for liquid products in sealed containers has been the elevated temperature type test.

Chemists have attempted to interpret elevated temperature storage in the light of an increase in reaction rate based on a doubling or trebling of the chemical reaction speed for each 18° F. (10° C) temperature rise. In some packaging applications this calculation has been found to yield results which permit fair accuracy in the prediction of shelf life.

When it first became obvious that storage stability would be a factor in aerosol quality and commercial demand for a quick check out on each product was the order of the day, a test series to be stored at 130° F. for one month with final evaluation at the end of that time became more or less routine throughout the aerosol industry. Early results revealed sharp disparity between normal changes with time and changes at 130° F. for the one month period; however, since nothing better was possible, the method continued as a standard one.

When aerosol shampoos originally hit the market they had been tested at 130° F. for as long as two or three months in some cases with a clear bill of health. The painful fact of the shampoo fiasco is still vividly remembered by all too many people. Serious perforative failure showed up within a very short time and it rapidly became apparent that the trouble was inherent and not due to some random condition. Without going into the ins and outs of the chemical detective work which followed, it was finally proved that only one condition would reveal the probability of perforative corrosion — normal storage. No typical shampoo corrosion of the perforative type has ever been observed through elevated storage test methods, as far as I know.

Many factors are involved in the satisfactory life of an aerosol package and when you stop to analyze the problem it is obvious that extrapolation from a single phenomenon cannot yield an accurate answer. If we put propellant and 190 proof ethanol into a Pyrex glass tube and seal it, known reaction rate interpretation would be possible. However our aerosol solutions — themselves usually complex as reaction processes go, may be put into a plastic lined metal container having rubber, plastic and various different metals in its components. Electrochemical reactions, physical change due to penetration of solvents or propellants into absorptive components with consequent dimensional change due to swelling, high temperature softening and penetration of plastics, and excessive pressures due to hydrogen evolution in quantities which might never occur at normal temperatures are all possible sources of departure from a linear extrapolation of shelf life with temperature.

Storage of soldered side-seam cans under pressure at 130°F. will now and then result in a type of failure which we can consider, for all practical purposes, non-existent at normal temperatures. This is due to high temperature solder fatigue. The loss in strength of the solder and an increase in internal pressure due to the high temperature combine to rupture the solder joint. Since soldering seam containers have been on the market for ten years, and since the reported incidence of burst containers is practically zero percentagewise, it seems fair to assume that this type of failure occurs only as a result of test conditions without a normal use parallel.

Valve performance may be unfairly evaluated after prolonged high temperature storage. Rubber or other elastomer components tend to take a permanent set — especially in the presence of various oils and solvents and may become inoperable due to loss of functional form. It is also possible for gross swelling to occur so that the dimensional relationships of the valve parts are completely distorted. Plastic parts may be so softened that if the valve is operated while still hot, they will lack the

We're keeping
our new Aerosol valve
under our new cover!
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Schrader®
ESTABLISHED IN 1844
AEROSOL VALVES made by the
manufacturer of the Standard Tire Valve since the first Automobile

$25,000

backs the switch to

SULFOXIDE

BR-135 and Dieldrin in new improved insecticide formula!

Exterminator's Challenge

Fame, Fortune Await Bug Who Can Make the Grade

By HAL BOYLE

Kansas City—(AP)—Do you have any little six-legged insect friends who would like to gamble their lives on a chance to win $25,000?

If so, Ralph G. Martin is the man for them to see.

Mr. Martin, president of the Cook Chemical Company, has built his lifelong hatred of bugs into a profitable multi-million-dollar business in insecticides.

Bugs are stubborn creatures. The best known way to kill bugs is to pinpoint them on a hard surface and then hit them a sharp blow on the head with a hammer.

While this form of insecticide appeals to the hunting instinct in man, it is too time-consuming and gives the bugs too great an advantage. By the time you find and hammer down a bug he has already had 3,612,489 decendants, and is probably ready to die of old age anyway.

The trouble with chemical insecticides is this: A chemical that is one bug's poison in time becomes another bug's meat. They develop an immunity.

Martin pioneered in the distribution of DDT and, later, chlordane, which was up to 10 times as strong as DDT. But strains of bugs now have emerged tough enough to survive either DDT or chlordane.

Martin isn't a man to give up easily. His latest weapon is an insecticide called "Real-Kill," fortified with still another chemical, dieldrin, which he says is 28 times as deadly as DDT.

Martin is so convinced of the strength of his new mixture that he has announced a $25,000 reward "for the first bug that does not die after being sprayed" with it.

The rules are quite simple. The contest will run for a three-month period starting in June, when bugs are in their best physical and mental condition. Any bug can enter voluntarily or, if you have one that's bashful, you can enter him against his will.

"There is no humbug involved," said Mr. Martin, who expects thousands of contestants from all walks of bug life in America. "If there is no winner—and I don't think there will be—the $25,000 will be given to a national charity."

Any bug who can stand up to the spray and walk away on his own six feet—or eight, if it should be a spider—stands to collect a lot more than the $25,000. That might turn out to be pocket change.

This news story dramatically emphasizes the faith of Cook Chemical Company in its new formulation of "Real Kill"—containing Sulfoxide.

Sulfoxide — product of S. B. Penick and Company — is an outstanding effective synergist . . . safe . . . non-irritating . . . with a mild, pleasant odor.

For technical information and suggested starting formulas for popular insecticidal sprays, send for your copy of our 12-page bulletin, SULFOXIDE.

PENICK

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8 · 735 W. DIVISION ST., CHICAGO 10

mechanical strength to perform their function.

From the foregoing it can be seen that, on occasion, 130°F. storage will yield results which may never occur at normal temperatures, and on the other hand may fail to show results which will occur only at normal temperatures upon prolonged storage.

As a result of the discrepancies which occur at 130°F. I have come to lean more heavily on results from the 100°F. storage series, which, as a matter of practice, have always paralleled the 130°F. series.

Storage at 100°F. is in a temperature range which is close enough to normal use temperature to be reasonable; yet certain effects are accelerated in a realistic way. Naturally the time interval for evaluation is greater than for the theoretically equivalent time at 130°F., but since there is no real equivalent the only alternative is to use whatever time interval is necessary. A three months test at 100°F. should give a fair indication of one year's storage—perhaps more. On occasion it has seemed practical to reduce the test period to two months, but this is safe only when all other evidence points to a high degree of product stability.

I do not want to imply that the 130°F. test series should be discarded. It is still routine for every new product in my laboratory, but its purpose has changed slightly. Where, at one time, it would have been the basis for a seemingly well founded opinion in its own right, it now serves only a a background guide for the ultimate educated guess based on the 100°F. test results.

With all the accelerated test procedures and their critical interpretation, a running start on normal storage is still highly desirable and for that reason a fairly large pack series to be stored under regular warehouse conditions should be made at the earliest possible time in the precommercial period of any new product. With such a pack in existence there will always be lead time on the commercial product. If trouble develops, it should show up in the experimental pack first, in time to take action on the commercial production.★

Editor's Mailbag

(*From Page 6*)

In your July issue we noted an item dealing with the west coast aerosol market. We do not agree that aerosol developments are lagging in this area; at least not in the Los Angeles area. Certain items have been developed in our area that we feel are superior to products in other markets.

I agree that we are slow in overcoming the reluctance of large eastern manufacturers to having their western requirements produced in the west, but we are making tremendous progress in overcoming our raw material price handicaps. With this obstacle out of the way, west coast aerosol packers will put western aerosol manufacturing on the map in a really substantial way.

Los Angeles will undoubtedly be headquarters for pressure packaging on the west coast, for adequate packing facilities are now available in the area. To demonstrate this, our volume has more than doubled so far this year. As for the potential, we have roughly fifteen per cent of the population in the eleven western states, and it is growing at a fantastic rate. Roughly 45,000,000 aerosols will be sold in our area this year, and that is just the beginning.

Pete Clapp
WESTERN FILLING CORP.
Los Angeles

We have no choice but to enter a plea of *non-vult*. The item, as originally written, was designed as a report on aerosol activity around San Francisco. In rewriting, our correspondent's comments were extended erroneously to apply to the entire west coast market.

The Editor.

I look forward to receiving this magazine, as I am sure it will be a great help to us. We are proposing to start loading aerosols as well as formulating our own concentrates, I shall appreciate your sending us any literature which you think might be helpful in this business.

David E. Lyons
LYONS, LTD.
Kingston, Jamaica

The introduction of your publication *Aerosol Age*, is indeed the most welcome sign of an industry growing up, that we have seen yet.

The writer, personally welcomes the sound basis in which you have introduced your publication, as one of the weaknesses of our industry has been the haphazard approach in most cases, not only to the problem of products, but more important, the merchandising which could increase sales, and naturally make more profitable the marketing of same.

We realize that following birth, must come growing pains. It is time however, for leaders of this industry to recognize some of the weaknesses which are causing a condition of very poor profit returns for all of the effort that must be expended.

I believe you can render a real service to this Industry, should you pattern your editorials with a view of co-ordination of efforts by responsible principals, who can work for the future success and reasonable returns of those who are now involved in developing the future of this business.

Elias Shapiro
PLASTI-KOTE, INC.
Cleveland

We are enclosing check and subscription card and would like to receive all copies of *Aerosol Age* from May on.

We are by far the largest manufacturers of aerosol equipment in Europe. It is our intention to extend our market by exporting to the U.S.A. also. We are sending you a copy of our complete catalog of aerosol packaging and testing equipment. We should like to be represented in your country, and if you can give us suggestions in this respect, we shall be much obliged.

Dr. Honisch
AERATOM AG
Rapperswil Sg., Switzerland

Our firm is in the process of establishing an aerosol packaging plant in Chile, and we are extremely interested in any information we can obtain on the subject.

Enclosed is our check in payment for a year's subscription to *Aerosol Age*. We should also be obliged if you would send us copies of all issues which have already appeared earlier this year.

SZILARD & CIA., LTDA.
Santiago de Chile

In your first issue reference was made to the confusing situation regarding terminology of propellants.

Paul B. Reed, Educational Director of the Refrigeration Service Engineers' Society, in his August 1956 Educational Bulletin made a decision concerning a method of overcoming some of this confusion. I have secured his permission to forward this information to you for reprinting as I believe that the aerosol industry might do well to follow the same pattern.

The section from the Educational Bulletin is as follows:

"*Designation of Refrigerants*

Now that, in addition to the Freons made by Kinetic, we have the Genetrons made by General, the Isotrons made by Penn Salt, and in Canada the Arcton made by Imperial, it is awkward to call them all 'Freons,' or use the long chemical name. An agreement has been reached to use the word 'Refrigerant' followed by the Kinetic number; so now Refrigerant 12 means dichlorodifluoromethane (CCl_2F_2) whether it is Freon-12, Genetron-12, or Isotron-12. The same is true of 11, 22, etc. Henceforth, we will follow this practice in the RSES Service Manual."

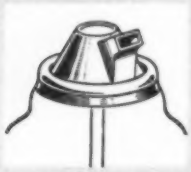
Lee J. Wallace
THE WALLACE COMPANY

a complete line of safe, dependable aerosols...

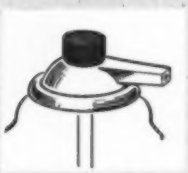
Thanks to VCA *Quality Valves!*

for every need....
a Standard VCA valve!

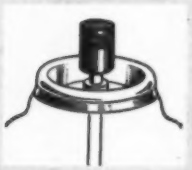
GLASS—Sensational new EMSON METERED VALVE—for cosmetics, pharmaceuticals, etc.



FOAM—all aerated products.



FOAM with the exclusive "twistick"—for soaps, shampoos, creams, cosmetics, foods, etc.



STAINLESS STEEL—Nylon stem—for hair lac, shave cream, pharm., cosmetics etc.

ALUMINUM—with the Metered valve—for all compatible products.

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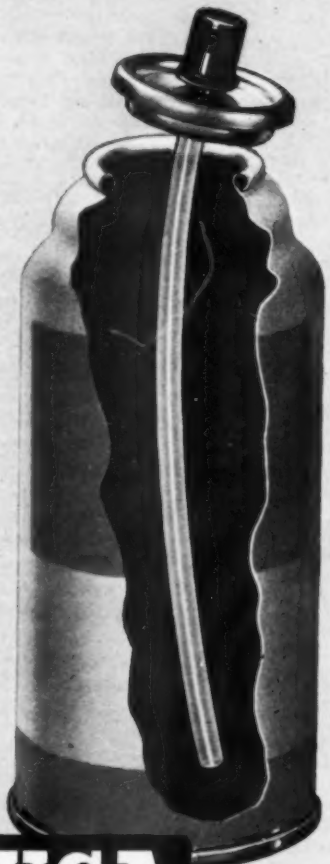
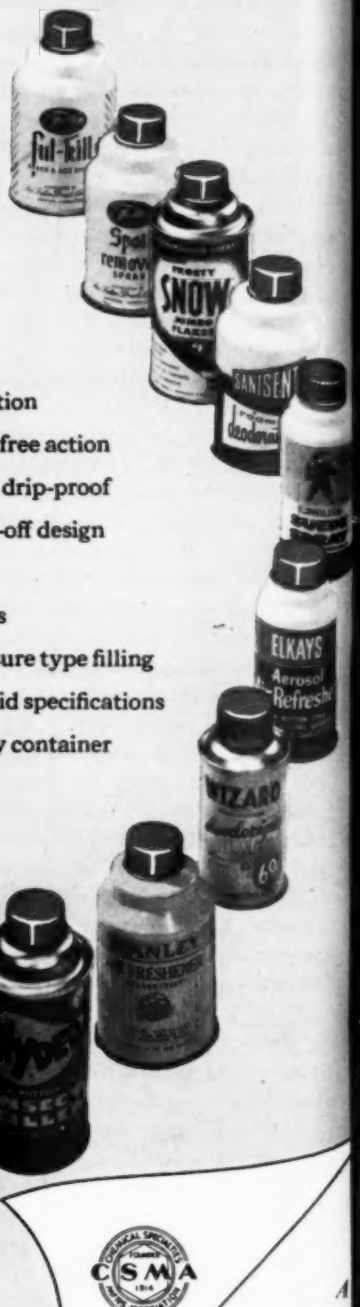
Experienced engineering and *exacting standards* in design, research and production of all standard and custom VCA valves, mean the difference between wasting dollars and making profits. Reorders are automatic for aerosols made with VCA quality valves.

VCA Quality Features:

- Modern design—sales appeal
- Tested to perfection
- Fingertip operation
- Simple, trouble-free action
- Leak-, clog- and drip-proof
- Immediate shut-off design
- All the colors
- All the flow rates
- For cold or pressure type filling
- Parts built to rigid specifications
- A valve for every container





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VCA specialized engineering service immediately available to solve your aerosol packaging problem.... big or small. No obligation. Inquire!

CSMA

A Cordial Invitation

Send specifications for sample valves and prices. Literature available

Who's Who in the Aerosol Industry

Harry E. Peterson, in July of 1955, founded the Peterson Filling & Packaging Co. in Danville, Ill. In just over a year the company has become one of the leading aerosol fillers in the Midwest, Mr. Peterson is president of the firm, and is at the same time active in the C.S.M.A. and Danville civic affairs.

Mr. Peterson attended the Illinois Institute of Technology and De Paul University, graduating from the latter in 1943 with a B.S. in Chemistry. From 1938 through 1947 he was with the Continental Can Co.'s Chicago Research Department, rising to the position of section chief of the Industrial Products Section. He joined Continental Filling Corp., Danville, in 1947, and became vice-president and general manager. From 1952 through 1955 he was president of Continental Filling, leaving to found his own company in July of last year.

During the course of his career in the aerosol industry, Mr. Peterson has taken a prominent part in the activities of the C.S.M.A. From 1948 through 1952 he served terms as chairman of two important committees, the Aerosol Scientific Committee and the Aerosol Division Administrative Committee. In 1952 and '53 he served as a member at large of the board of governors of C.S.M.A., and the following year was elected second vice-president. Last year he moved up to first vice-president.

In Danville he is past president and a member of the St. Elizabeth Hospital Advisory Board and various other civic groups.

Stanley J. Goldberg, president of the Aerosol Research Co., Forest Park, Ill., has been himself an inventor of note in the aerosol industry. He entered the industry back in 1949 as president of the Minit Spray Corp., and while with that company introduced one of the first aerosol paint packages under the trade name "Spraint". He created the first two-piece paint valves, known as the LA-10 Threaded Style Lower Valve Assembly and the DD-10 Removable No Klog Spray Head, both of which are now manufactured by the Aerosol Research Co.

Mr. Goldberg organized the Aerosol Research Co. in August, 1952; and in May, 1955, due to conflicting interests, the Minit Spray Corp. was sold. Aerosol Research now manufactures a complete line of aerosol valves, besides the two-piece paint valves, and supplies them throughout the U. S. and in 14 foreign countries. The company also manufactures in Australia and Japan.

Walter E. Dove, director, entomological research, Fairfield Chemical Division, Food Machinery and Chemical Corp., Baltimore, was about the first to shake the hand of Dr. Lyle Goodhue and take a look at Goodhue's original 3 lb. aerosol insecticide bomb. It made use of an oil burner nozzle. This big and potent weapon loaded with 0.8% pyrethrins in Freon 12 made a spectacular demonstration. After initial examination of the bomb in the South Building of Agriculture, Dr. Dove made an appointment with Colonel W. S. Stone of the Surgeon General's Office, U. S. Army. The effectiveness of minute quantities of the aerosol was demonstrated against caged mosquitoes exposed in doorless and windowless shacks in the vicinity of Beltsville Research Center.

Since a soldier could not be expected to carry around a 3 lb. bomb, an early invitation brought in the Westinghouse Corp. to design and supply a container. This resulted in the 1 lb. bomb with a screw

(*Turn to Page* 52)

Lenk
ZIP
INSTANT SPRAY
CLEANER
ACTIVATED CTC
REMOVES OIL, GREASE, DIRT
FROM METAL PARTS

WINDOWS
JET-SPRAY
BON
AMI
PUSH-BUTTON
CLEANER
with
SILICONES
WOODWORK

New Products and Packages

Plasti-Kote Engine Degreaser and Motor Cleaner in an aerosol container has just been offered by Plasti-Kote, Inc., Cleveland. The cleaner is for removal of grease on automobile motors, engines and machinery. It retails for $1.49. Crown Can makes the container.

Zip Instant Spray Cleaner, by Lenk Mfg. Co., Boston, is formulated to remove oil, grease and dirt from metal parts. The new aerosol in a 16 ounce container is also suggested for use in drying out wet ignition systems on boats, trucks and autos.

Bon Ami Co. has just put "Jet Spray Bon Ami" on the market, an aerosol cleaner designed specially for cleaning glass. It carries a special Risdon valve and is packed in a Continental Can container. It is pressure-filled by Continental Filling Corp., Danville, Ill. See Pg. 43 for further details.

Medihaler, one of the first aerosols containing a fluorinated chlorinated propellant for internal use by humans is offered by Riker Laboratories, New York. Medihaler contains either epinephrine or isoproterenol for treatment of asthmatic attacks. The product is fitted with a metered valve made by Emson Research, Bridgeport, Conn.

DGF-123, dry graphite film lubricant for service stations and repair shops, is now available in a 12 ounce, self pressurized sprayer. DFG-123 is manufactured by the Miracle Power Division of the AP Parts Corp., Toledo. The dry film lubricant is a dispersion of colloidal synthetic graphite in Fluron, a volatile carrier.

"Fourth Dimension," is one of Helena Rubenstein's, New York, new aerosol colognes packaged in the popular plasticized bottles. Risdon Valve, Naugatuck, Conn., supply the valve and brass cap in this package; Associated Brands, Brooklyn, are the custom fillers, and T. C. Wheaton, Millville, N. J. supply the glass bottles. The 3 oz. product retails for $3.50 in major department stores.

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The wonder insecticide that is the most toxic to insects and the least toxic to humans and warm-blooded animals of *ALL* currently known insecticides.

Prentox Pyrethrum & Pyronyl Concentrates are available for:
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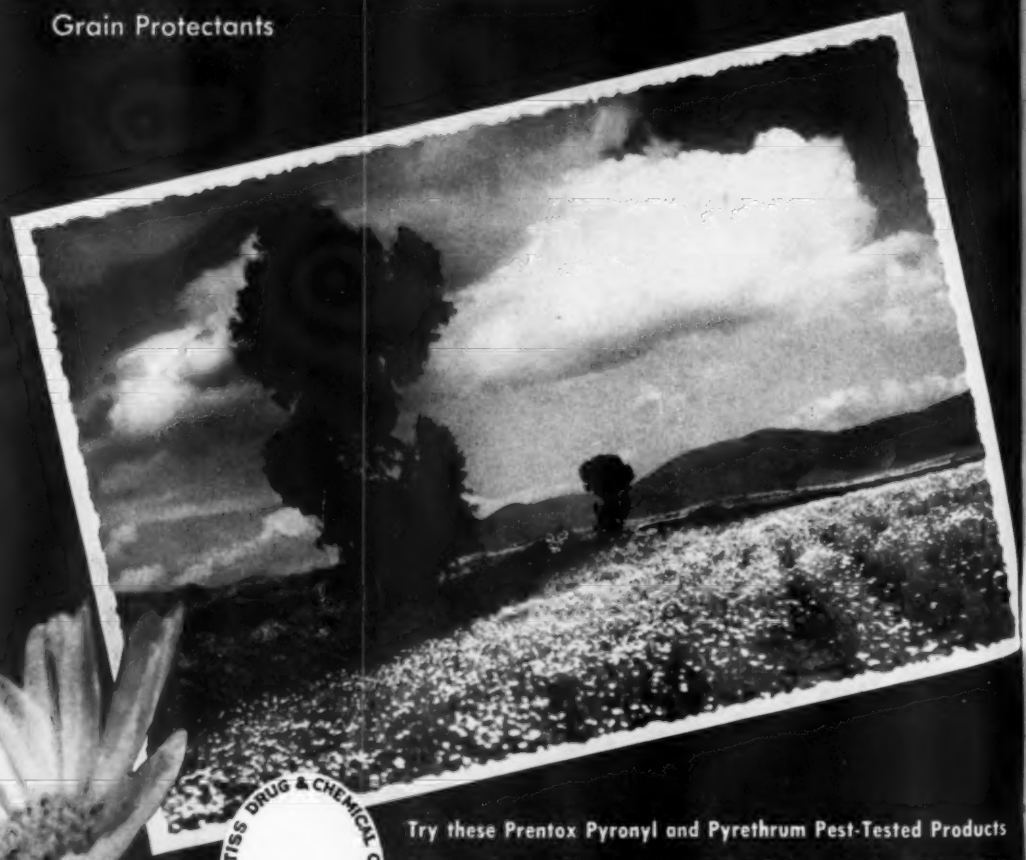

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NEWS of Pressure Packaging

$1 Million Advertising Campaign Launched To Sell New Bon Ami Aerosol Glass Cleaner

A BRIGHT new aerosol product hit the national consumer market the week of August 13, backed by an impressive $1 million advertising campaign on television, radio, and in the press. "Jet Spray Bon Ami", a window and household cleaner manufactured by the 70-year-old Bon Ami Co. (now controlled by the United Dye & Chemical Co.) is the cleanser company's first completely new product in 43 years.

The product's recently-completed test marketing in three Eastern cities, Syracuse, Richmond, and Harrisburg, Pa., was so successful that the company quickly prepared its campaign for sales in the country's stores and supermarkets. Though aimed primarily at the $12 millions annually in retail window cleaner sales, Jet Spray is reportedly good for refrigerators, mirrors, tiles, venetian blinds, painted woodwork, seat covers, counter tops, and car chromium. The company sees its potential sales cutting substantially into the retail sales of household ammonia, cleansers, wall and floor cleaners, and even of soaps and detergents.

The new aerosol was developed by Dr. Dan Terry, Bon Ami vice-president in charge of research, in 1953; but the company did not make its actual decision to embark on the aerosol field until it was recently taken over by United Dye & Chemical.

Jet Spray is a three-phase aerosol, employing a lighter-than-water propellant and a specially-developed Risdon valve. It is being packaged in a stackable Continental Can container, and is pressure-filled by the Continental Filling Corp., Danville, Ill. It is reported that Dr. Terry has beaten the problem of corrosion — through work on the formulation — and of spray splash by having the valve deliver the product in a foam. Jet Spray contains no powder, thus eliminating much of the problem of residues left on glass by many conventional cleaners.

Bon Ami has set a price of 69¢ on the product, pushing it into immediate competition with other conventional non-aerosol window cleaners.

•

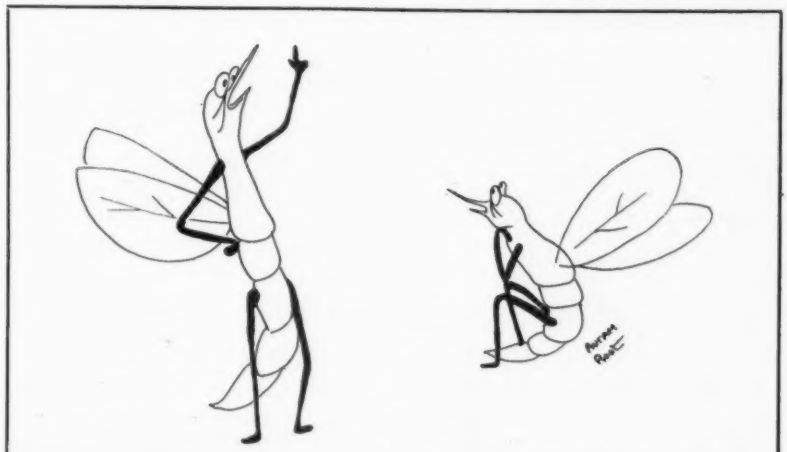
Sprayola Set For Market

"Sprayola" a new aerosol shoe polish developed and marketed by the Power-Matic Corp., Scranton, Pa., will soon be placed on the national market, after successful test sales in sections of Pennsylvania. The company's novel development of an economical method of making high-melting point waxes suitable for aerosol dispensing was just recently patented.

According to the company, the method has cut down all loss of the polish ingredients through evaporation, and the formulation contains no water or lacquer ingredients. The suggested prices for the product are 79 cents for the 6-oz. can and 98 cents for the 12-oz container. It comes in brown, black, tan, ox-blood, neutral and white.

Power-Matic, a contract packager, reports that its newly-patented process permits use of a high-melting-point wax in a supersaturated solution, in which the propellant is the solvent. The company also makes an aerosol gun oil, which allows spraying of the weapon without disassembling.

Our cartoon is the work of Avram Root, 12-year-old son of Morris Root, of G. Barr & Co.



Always remember, Son, keep away from women and aerosols!

Natural Products Expands

Natural Products Corp., Montreal, last month announced that construction of its new building at 60 Clarkson Ave., Toronto, will be completed by September 1. At this new location will be the Ontario sales office, adjoining a new warehouse. The company's business in Ontario is under the management of J. Harry Trotter, a director of the firm.

•

Name Bengert To College Post

George W. Bengert, president of the Norwich Pharmacal Co., Norwich, N. Y., has been named to the board of advisory regents of Le Moyne College, Syracuse. He joined the company as a research chemist in 1922, was appointed a director in 1942, a vice-president in 1946, and executive vice-president two years later. He became president earlier this year.

Mr. Bengert is a member of the American Drug Manufacturers Association, the American Chemical Society, and the Drug, Chemical and Allied Trades Section of the N. Y. Board of Trade. He is also a member of the board of consultants at Marymount College, and is a director of the World Medical Association.

•

American Can Earnings Up

American Can Co., New York, has reported sales and earnings for the three and six month periods ending with June were the highest for any similar period in the firm's history. Net income amounted to $15,030,893 for the first six months of this year, compared with $14,417,672 in 1955. At the same time, the company announced that adequate inventories of tinplate and steelplate during the steel strike prevented any curtailment of the company's business.

•

Announce 2 Krylon Products

Krylon, Inc., Norristown, Pa., has announced two new aerosol products for industrial uses. The company is reportedly one of the largest makers of spray coatings and industrial products in aerosol containers. The new products are "Tenac", a heavy duty spray lubricant for open gears and cable, and "Krylon Spray Cleaner and Degreaser, which removes greases and oils from any surface.

Both products are being marketed in a 16.2 ounce aerosol container, and both retail at $1.95. Tenac is being produced under exclusive license from E. F. Houghton & Co.

•

Bob Ablanalp To Marry

Robert Ablanalp, Precision Valve Corp., Yonkers, N. Y., longtime holder of the title of most eligible bachelor in the aerosol industry, is planning to be married this fall.

Two views of the production line for Breck Hair Set Mist at John H. Breck, Inc. Springfield, Mass. In the upper photo, at the beginning of the production line, the containers are being loaded onto the conveyor belt. As the cans, loaded with the hair set mist and propellant, come off the production line (lower photo) they are checked and capped.

Breck Describes New Product

The *Breck Gold Box* (May-June, 1956), a house organ of John H. Breck, Inc., Springfield, Mass., describes in detail for the company's employees the aerosol principle and technique used in a new pressurized product, Breck Hair Set Mist. The article, entitled "The Pressure is on . . ." relates in brief, detailed text and pictures how the propellant for hair set mist is loaded by the refrigerated method, how the valve assembly is inserted, and how the 130°F. water bath method is used to test safety factors of the package.

According to the article, the newest Breck preparation has a new style push-button with a slanted top and a concave or hollowed-out center that makes the spray direction discernible at the touch of a finger. The tension of the button also prevents over-use of the hair set.

Pack-It in New Quarters

Pack-It, a Newark, N. J. company specializing in contract packaging and private label formulation, has moved to new quarters at 222 Pacific St., Newark. The firm's new offices and plant will occupy three main buildings with a total floor space of 70,000 square feet, plus a shed area that includes four storage buildings. The three main buildings will be used to package pharmaceuticals, toiletries, household and industrial chemicals, and garden supplies. The new plant is expected to be in full operation by Sept. 1.

CSMA Announces Dates, Categories, Rules For Presentation of 1956 Aerosol Awards

THE Chemical Specialties Manufacturers Association last month issued the category listings, the rules and the dates for the granting of the 1956 Aerosol Awards. The initial announcement, made at the association's New York headquarters, listed the award dates as December 3-5, 1956, with the judging and selection to be held in conjunction with the CSMA's 43rd annual meeting at the Mayflower Hotel in Washington, D. C.

The ten award categories include almost every possible aerosol type, and since the rules specify that "Awards will be made on the basis of general sales appeal of the complete package," entries by smaller firms are expected to rank especially strong this year. As announced by Frederick G. Lodes, chairman of the aerosol awards committee, the classifications are:

1. Insecticides, Repellants and Moth Proofers
2. Room Deodorants
3. Paints, Enamels, Other Protective Coatings and Paint Remover
4. Other Household Products—polishes, glass cleaner, rug shampoo, water repellants, etc.
5. Shave products
6. Hair preparations
7. Other Personal Products—shampoos, body deodorants, sun tan oil, drugs, etc.
8. Snow—all types
9. Industrial Products—lubricants, stencil inks, belt dressings, etc.
10. Glass and Plastic Aerosols—all products

Since the results of the contest will be publicized widely in the leading merchandising magazines, in trade periodicals, and local and national newspapers, prestige and advertising values of the awards are considerable. There are no entry fees or other charges to entrants.

Though contest entries close October 15, the awards committee chairman urges that entries be sent as soon after September 15 as possible. The entry should comprise one completely assembled *empty* container, plus a completed entry blank. Forms for Application of Entry are available from the Aerosol Awards Committee of the CSMA, 10th floor, 50 East 41st Street, New York 17. They request: name of company, name of individual authorizing entry, brand name, class of product, and group number, plus specific shipping information. Since the rules specify that the product must have been on the market "and have been freely offered for sale" prior to Sept. 1, new products entered on the market after that date are excluded.

•

VCA Increase Mfg. Facilities

Valve Corporation of America, Bridgeport, Conn., have just leased increased space in their present building to expand valve manufacturing facilities. An additional 1200 square feet have been acquired and, at the same time, new production facilities have been increased, according to Philip Sagarin of VCA.

•

Eastern Sales Mgr. for Barr

Leonard S. Baer has just been appointed eastern sales manager for G. Barr & Co. Announcement of the appointment was made August 16th by Douglas Atlas, vice-president of the company. Mr. Baer's office will be located at the Barr eastern plant in the Bronx. Mr. Baer has worked in the aerosol industry for several years. He is a native of Bridgeport, Conn., and now lives in Stratford, Conn.

Barr's main plant and executive offices are located in Chicago. Plants are also operated in the New York area and in Los Angeles.

•

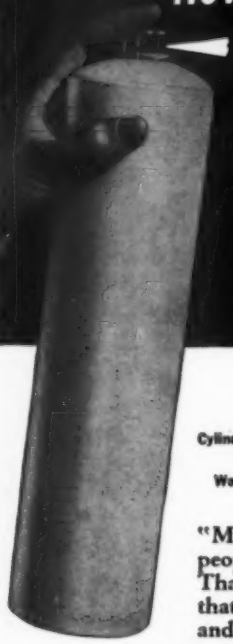
Spray Mist Incorporated

Spray Mist, Inc., a new company with offices at 66 Court Street, Brooklyn, N. Y. has been granted a charter of incorporation in the County of Kings, N. Y. It lists 200 shares with no par value, and the directors are Simon Ackerman, Elsie Ackerman, and Eugene Gold, all of Brooklyn.

Rules of the best package contest:

1. **All entries will be made in the name of the brand owner or marketer. The product must be on the market and have been freely offered for sale prior to September 1, 1956.**
2. **Entries will close October 15, 1956. All entries should be sent as soon after September 15, 1956 as possible, to the Aerosol Awards Committee at this office, and should comprise one completely *assembled empty* container with attached tag showing (a) name and address of the brand owner; (b) class in which entry is made by member as noted above.**
3. ***Send one completed entry blank for each package entered when shipment is made.***
4. **Only one entry may be made by any marketer or brand owner in any one class, but entries may be made in as many classes as desired by each.**
5. **Entries are open to *any aerosol brand owner or marketer* anywhere and are *not* restricted to members of CSMA.**
6. **There are no entry fees or other charges to entrants.**
7. **All products shall be adequately labeled and in compliance with laws and regulations.**
8. ***Awards will be made on the basis of general sales appeal of the complete package.***
9. **Packages cannot be returned. CSMA can assume no responsibility for the packages.**
10. **Upon receipt of each shipping carton, a post-card acknowledgment will be sent to the shipper. The contents of the shipping carton will not be checked until all packages are assembled for judging.**
11. **All packages entered will be re-shipped by CSMA to the hotel and will be on display at the 43rd Annual Meeting in the Mayflower Hotel, Washington, D. C.**
12. **The committee reserves the right to reclassify any entry prior to judging and to reject any entry it deems advisable.**
13. **Best packages will be selected in ten classes as noted above and a "best package in the show" will be chosen. Judging will be done by a group of qualified persons. Their decisions will be final. Announcement of winners and award of certificates will be made at the 43rd Annual CSMA Meeting in Washington, D. C.**

How TMC King Size Disposable and Refillable pressure CONTAINERS introduce a Challenging Competitive Weapon



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"Make it easier to use and people will use more of it"! That is an industrial axiom that has been proved again and again over the years.

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AND NOW industry is going "King Size" with TMC Disposable and Refillable Containers for aerosols.

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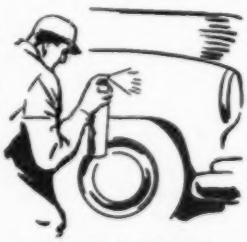

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PCO's—Dealer for Aerosols?

"How to Promote and Sell Aerosols and Allied Products" is the title of an article appearing in the July 1956 issue of *Pest Control*, Cleveland, co-authored by Austin Lempit, Airkem, Inc., Jack C. Varley, James Varley & Sons, Inc., John V. Lembach, Residex Corp. and Blanton J. Whitmire of Whitmire Research Laboratories. The article points out that the pest control operator can do a profitable business in over-the-counter sales of industrial aerosol insecticides and deodorants, building up an attractive sideline.

It is suggested that PCOs have two good markets for aerosol insecticides: first, regular customers who may need an aerosol insecticide to supplement routine service calls, and second, homeowners who have minor insect or rodent problems which would not justify a trip by a serviceman. Potential buyers of aerosol insecticides could be expected to have more faith in recommendations of pest control operators on insect problems, several of the authors indicate, because PCOs are obviously experts in the field of insect control. Since as a general rule, premises also need deodorizing following treatment by the PCO, there are obvious further opportunities for the sale of deodorant sprays.

A number of contributors to the symposium suggest that aerosol insecticides and deodorants can be a quite profitable sideline for the PCO if top quality products are handled and if sales are promoted on a professional basis, featuring high-strength products in large size containers.

•

N. Y. Cos. Chemists to Meet

The New York Chapter of the Society of Cosmetic Chemists will resume its monthly meetings Sept. 26 in the Metropolitan Room of the Brass Rail Restaurant, New York. Guest speaker, Amos Light, research pharmacologist, Wellcome Research Laboratories of Burroughs Wellcome, Inc., will discuss "Peripheral Vascular and Absorptive Changes in the Aging Skin," using slides to demonstrate work done on penetration and absorption through the skin.

Expanding on West Coast

Western Filling Corp., Los Angeles, aerosol fillers, more than doubled their volume in 1956. A new cold filling line has recently been added designed specifically for hair sprays, room deodorants and other items of this type. It has a capacity of 36,000 units per 8-hour shift. Western Filling also operates a special line for hazardous products like liquefied petroleum gases, starter fluids, sulfur dioxide, etc., with a capacity of 15,000 units per hour. Paints, shave cream, glass cleaners, etc. are pressure filled on a third machine having a capacity up to 25,000 per shift depending on product. Another special line fills 2 lb. "Charge-A-Can" cylinders with propellant 22 and methyl chloride.

In the past, raw material price differentials between east and west have impeded growth of the aerosol business on the west coast. This situation is now being changed rapidly, however. A major can company is now equipped to produce both 6 oz. and 12 oz. cans, and will be producing 16 oz. cans in Los Angeles by January, 1957, at prices competitive with those in the eastern market. A new propellant plant will go into operation at Antioch, Calif., by September. As a result, the price of propellant on the west coast has been lowered so that there is now only a very minor differential between prices quoted on east and west coasts. Also a new aluminum aerosol can will shortly be in production in Riverside, Calif., offering new designs in packages heretofore not obtainable in the aerosol metal container field.

All of these developments are believed by observers on the west coast to presage important expansion in the west coast aerosol market.

•

Acquire Reserpine Patent

S. B. Penick & Co., New York, last month announced that it has acquired rights as licensee from Ciba, Ltd., covering Reserpine and its salts under Ciba's U. S. Patent No. 2,752,351. By the terms of the agreement, Penick is fully licensed under any domestic or foreign Reserpine patents already issued to Ciba. Reciprocal arrangements are being considered with respect to Penick's patents for other Rauwolfia extracts.

The Company reports that users of its Reserpine may now include it in any of their finished preparations without further licensing or royalty payments.

•

Canco Names Beard Div. Mgr.

W. S. Beard has been appointed manager of sales for American Can Company's Atlantic division, New York. Mr. Beard, former assistant division manager of sales, succeeds Daniel T. McFadden, who has been appointed assistant to Edward K. Walsh, Canco's general sales manager.

Other appointments in the Atlantic division sales include: D. B. Ressler, former North Jersey District sales manager, who was named assistant manager of sales. He will be succeeded by R. V. Bradley, former salesman in the metropolitan New York district sales office.

J. M. Asensio has been appointed assistant to Beard, succeeding E. J. Gazda, who was named supervisor, administrative group of the division sales force.

D. J. DeLand, former manager of the Philadelphia district sales office, has been appointed commodity manager in charge of fibre container sales. He will be succeeded at Philadelphia by W. H. Gaul, former salesman in the Philadelphia district office.

•

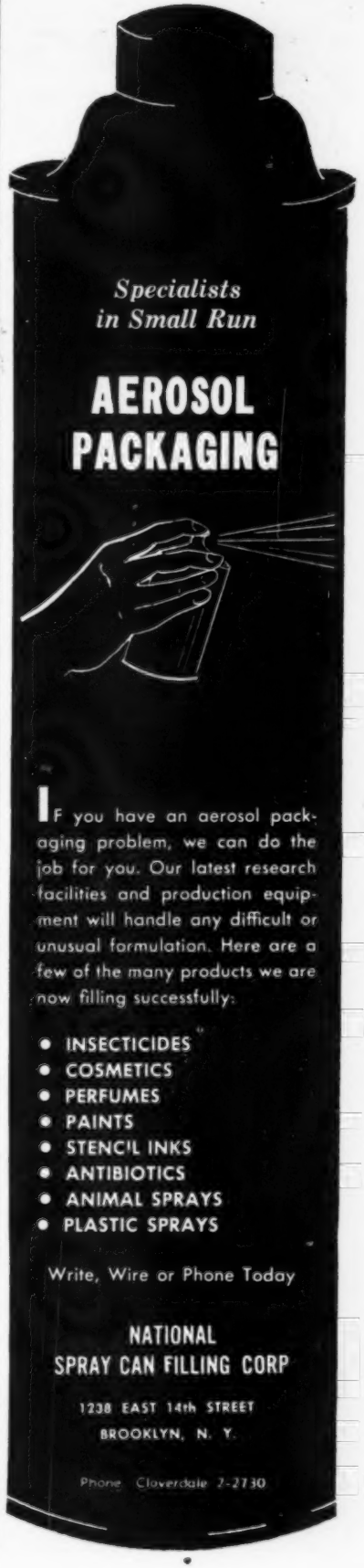
de Hoyos Conference Speaker

Mr. Luis de Hoyos, vice-president and treasurer of Synfleur Scientific Laboratories, Inc., Monticello, N. Y. was one of the panel speakers at the Eighth Annual Conference on American Foreign Policy, held recently at Colgate University, Hamilton, N. Y. His comments centered on problems in Latin America.

•

Martin Adelmann Dies

Martin Adelmann, for many years production chemist with Schimmel & Co., New York, died recently while on a visit to Germany. He was a graduate of the University of Wurzburg and had been associated with the company for more than 20 years.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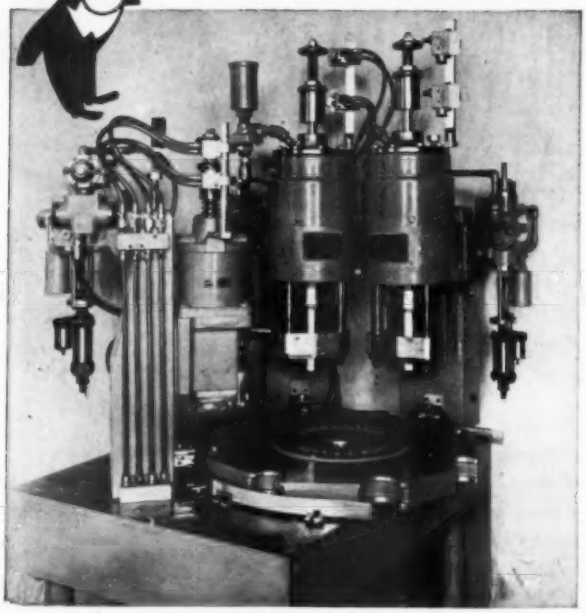

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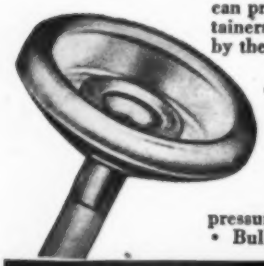

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Products—Processes—Bulletins—

Develop New Spray Counter

The Bete Fog Nozzle, Inc., Greenfield, Mass., recently developed a new electro-mechanical counter which makes fast work of the once tedious task of measuring and counting thousands of droplets. Photographic negatives of the enlarged images of the droplets are projected on a screen with an overall magnification of 400 to 1. The operator places a caliper on the image of a droplet and presses a button that actuates an electrical counter corresponding to the diameter of the drop in free air.

The caliper has a sliding switch with a series of contacts machined to indicate the opening between the caliper points. Before and after readings of the counters yield the number of drops in each size range. With this equipment it is reported that 5,400 drops per hour can be classified and counted by an average operator. The company leases or sells the counters.

Describe Suspension Agent

A recent edition of *The Givaudanian*, a publication of Givaudan-Delawanna, Inc., New York, gives a detailed description of some of the advantages of the company's suspension agent, "Deltyl Extra," for use in powder aerosols. The article defends the agent's compatibility with basic cosmetic ingredients, pointing to its long use in such toiletries as creams and lotions, powders, bath oils, lipsticks, etc.

It reports that Deltyl Extra is usable in low concentrations, will not turn rancid, is colorless and practically odorless, is greaseless, and has exceptional solvent properties. The article reviews also such factors as use of different propellants, pressures, effect of particle size, type of adherence, etc., as they affect the performance of the various powder aerosols.

•

Issue Warning Label Book

Warning Labels, A Guide for the Preparation of Warning Labels for Hazardous Chemicals—Manual L-1 is being distributed to each member company of the Chemical Specialties Manufacturers Association. The fourth edition of the manual was prepared by the Labels and Precautionary Committee of the Manufacturing Chemists' Association, and is available at $1 per copy at the MCA's office, 1625 Eye Street, N.W., Washington 6, D.C.

The book is widely used by federal and state agencies, and is generally consulted by manufacturers using chemicals in their products. Its principles of precautionary labeling have been approved by the U.S. Public Health Service. The preface to the book points out that "The warning labels suggested in this manual should be used in addition to, or in combination with, any label required by law."

The manual is divided into three parts. Part I sets forth principles for the preparation of warning labels. Part II contains suggested warning labels for specific chemicals illustrative of the application of the princi-

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- ANTIBIOTICS
- ANIMAL SPRAYS
- PLASTIC SPRAYS

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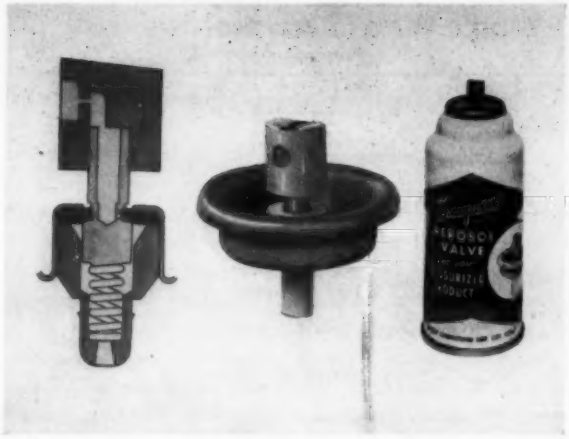
New Nylon Valve



Seaquist Mfg. Corp., Cary, Ill., has just gone into production on a new nylon valve which E. J. McKernan, Seaquist sales manager, says can be used for a wide variety of pressurized products. Because it fits so many applications, its adoption minimizes the need to carry in inventory a wide variety of valves for different purposes.

A sealing and retaining ring is said to hold the pressure button firmly on the stem, eliminating the possibility of lost buttons and preventing seepage between stem and button. Three controllable orifices permit any desired density of spray. Because of its nylon construction the new valve is resistant to corrosive products.

ples. Part III contains suggested warning labels showing the application of the principles to a group of chemical products used in the pesticide field. A glossary of terms used in the manual is also included.

•

European Catalogue Issued

Aeratom Ltd., Rapperswil, Switzerland, has issued a catalogue depicting and describing its line of compressed-air operated pressure filling equipment. According to the company, the gas loss with Aerotron equipment is only a fraction of that customarily experienced with the cold filling process.

•

New Bulletin Published

A completely revised bibliography of the literature on "G-4" (Dichlorophene) has just been published by the Sindar Corp., New York. Called Technical Bulletin D-2, it contains abstracts of some 109 scientific trade articles, as well as abstracts of 12 patents, both foreign and domestic.

The bulletin has been indexed so that any abstract on a given subject can be easily located. The index is divided into seven major categories including: Biological Properties, Compatibility, Patents, Physical and Chemical Properties, Test Methods, and Toxicological Properties and Uses.

•

To Change Shipment Rules

Two newly proposed changes in the regulations of the Interstate Commerce Commission concerning the safe shipment of aerosol products are currently under study by the aerosol industry. The changes were distributed to the industry by the Chemical Specialties Manufacturers Association, New York, in an urgent bulletin in mid-August, and the association has requested that replies be made by Sept. 5.

The changes, made on specific recommendations of the Bureau of Explosives, are as follows:

Inside metal containers charged with a solution of materials and compressed gas or gases, of capacity not exceeding 32 cubic inches. Contents of the container must be non-poisonous but may be flammable as provided in S 73.300 (b) (2), (3), and (4) provided the flash point, as determined by Bureau of Explosives' Method, is not less than 20° Fahr. Pressure in the container not to exceed 75 pounds per square inch absolute at 70° Fahr. and the liquid content of the material and gas must not completely fill the container at 130° Fahr. Each completed container filled for shipment must have been heated until content reached a minimum temperature of 130° Fahr. without evidence of leakage, distortion, or other defect. (73.302 a-3.)

"(9) In inside nonrefillable coated-glass or metal container of not more than 8-fluid ounce capacity, charged with a non-poisonous drug, medicine, cosmetic, or soap and gas to a pressure not exceeding 85 pounds absolute pressure at 70° F. or 150 pounds absolute pressure at 130° F., and capable of withstanding without rupture or leakage one and one-half times the pressure at 130° F." (73.302 a-9.)

The CSMA, in its bulletin listing the changes, has requested that any adverse criticism of the immediate problem "be confined to shipping matters," but announces it would also like to receive favorable comments. Serious adverse criticism, if any develops, will be handled at a special meeting of the CSMA at 11:30 a.m. Sept. 13 in New York, with location to be announced later.

Who's Who in Aerosol Industry

(*from page* 39)

cap nozzle, a bomb that found use wherever our armed forces served.

Pyrethrum waxes persisted in clogging the nozzles of the Goodhue bomb but this difficulty was overcome by Dr. Herman Wachs and R. B. Stoddard who supplied a purified pyrethrum extract. Using the Westinghouse device and the new pyrethrum extract, tests were conducted at Orlando, Florida in large rooms against house flies and mosquitoes by Herman O. Schroeder. These tests led to initial adoption of aerosols by the U. S. Army, and paved the way for a continuing test program at Beltsville. The first public demonstration on the use of the "bug bomb" was made against flies at the National Airport in Washington in 1942. The device was first exhibited to the National PCO Meeting in Chicago in the fall of 1942. The use of the bomb was made a part of the training program for officers visiting the Orlando laboratory.

Dr. Dove holds a BSc. degree from Mississippi State College and an ScD. degree from Johns Hopkins University. He served for many years in the Bureau of Entomology and Plant Quarantine of the U.S.D.A. In 1942 he organized and set-up the research and development program for the armed forces at Orlando, after which he was transferred to Washington as chief of the Division of Insects Affecting Man and Animals. Since 1945 he has served on scientific committees for the industry and as an advisor to the Quartermaster on pesticide problems.

Aerosol Colognes

(*from page* 13)

well simulated. We do not need to devote more space to the absolute necessity for uniformity, and conformity . . . since anyone in the perfume industry knows how critical this factor is. But apparently it is here that the greatest job needs to be done in the aerosol perfume laboratory: producing an aerosol fragrance identical with the fragrance of the usual package.

There have been few complaints on workability of aerosol packages, we were told, and women generally approve of the convenience of the "special atomizer attachment." But they are a little concerned about the price of the new mist sprays, which are a little more expensive than ordinary colognes. Several of the average colognes are packed in attractive bottles and offer a "free atomizer." The "mist cologne" must compete with this lower priced sister, and still offer other advantages.

The woman who has already used an aerosol cologne has still one other criticism, and that is that the "mist products" are "used up too fast." The convenience of the pressure dispelled cologne apparently lends itself to greater and more lavish use. These

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Dead Stop Indicator for Karl Fischer Titrameter
Density Units
High Pressure Test Bombs
Can Sampling Units — Piercing or Valve Actuating
Pressure Gauging Unit — Pressure Balance or Water Filled
Flammability Set
Test Ovens — Standard or Custom Built
Instantaneous Chiller Units — Mechanically Refrigerated
Electric Hot Water Test Bath Standard or Custom Built
Hot Water Bath Transfer Baskets Safety Top
Tank Racks
Table Tank Rack Combinations
Safety Screen Tubes for Glass Pressure Tubes
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Gloves
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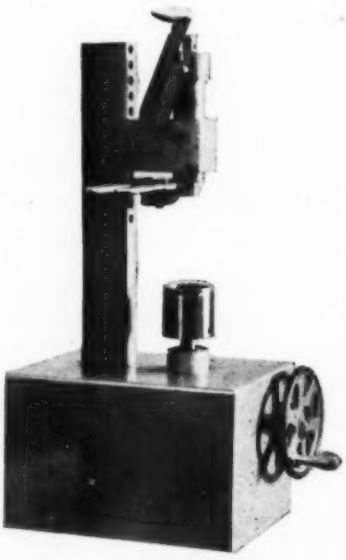


Foresman Hand Operated Vial Capper

same customers recognize, however, that a certain economy is also associated with the package, since it is not "wasted" by pouring on the hands in being applied. They wonder however, if too much of the cologne is propelled into the air and not onto the person. These are some of the questions to be answered by the industry in advertisements directed to the consumer.

The "mist cologne" is popular as a "gift item", or for use when traveling the concensus of salesgirls shows, but the aerosol industry, we're sure, is seeking the much wider outlet of every lady's bathroom shelf and dressing table.

This brings to mind the final factor — the aerosol bottle itself. The industry has outdone itself in producing very attractive and appealing packages . . . the texture of the plasticized bottle is pleasing, the shapes smart and modern, the cap generally a gold flash. Yes—the package appeals to women—but women object to throwing them away when the contents have been used. Every routine sales appeal to women stresses economy, and she cannot adjust to the practice of discarding an attractive package (even the paper and ribbons of Christmas gift wrappings are often stored away for use the following year).

The cosmetic industry has never encouraged refunds on containers, and this is not the solution suggested . . . but perhaps some practical use can be found for the "used bottles". Admittedly they are too small for lamp bases . . . but what about candle stick holders, or perhaps arranging for refilling the bottles. (Some manufacturers are offering colognes in refillable bottles). Surely the research departments of the perfume manufacturers or the aerosol fillers can find some way to solve this psychological rebellion in the American woman.

•

Babbit Chairman Dead

Alan N. Mendeleson, chairman of the board of B. T. Babbit, Inc., died late last month in Rockland, Me. He had been chairman of the firm, which manufactures household cleaners and just recently entered the aerosol field, for the past five years. He was the third generation of the family to head the Babbit company. His grandfather, the late Aaron Mendeleson, and his father, the late Jerome Mendeleson, were previously presidents of the company.

•

VCA Sales Mgr. On Trip

Sigmund Was, sales manager of Valve Corporation of America, Bridgeport, Conn., is currently on a two week combination business and pleasure trip to Cuba and through southern U. S.

•

Puro Marketing Deodorant

The Puro Co., St. Louis, recently placed on the market its "Deodorant Bomb," designed principally for hotels, institutions and schools. Packaged in 12-oz. containers, the aerosol deodorant is available in private labeling on orders for one or more gross.

Pyrethrum in Aerosols

(*from page* 25)

This year approximately 3,500 tons of Pyrethrum were imported into the United States. It is estimated that in 1956-1957 4,000 tons will be imported. In succeeding years this figure should rise, production permitting.

Even though Pyrethrum is one of the older insecticides, it is the opinion of many in the insecticide industry that it is the one insecticide which has a tremendous future. One field which at the present time appears unlimited for its use is in the control of stored products insects, where a non-poisonous insecticide is absolutely essential. No doubt in the new field of pressurized aerosols, Pyrethrum will also find heavy acceptance as it has in other units. Aside from commercial application there should be additional quantities of Pyrethrum insecticides used in the home, not only because of the low toxicity of Pyrethrum, but also because of its high rate of efficiency against resistant strains of insects.★

For Maximum Safety in Aerosol Use

make sure that your labeling carries the following five-point caution statement:

1. **Contents under pressure**
2. **Do not puncture**
3. **Exposure to high temperatures may cause bursting**
4. **Keep at room temperature — away from direct sunlight, radiators, stoves, hot water and other heat**
5. **Never throw container into fire or incinerator**

Do Your Part To Keep The Aerosol Industry's Safety Record Spotless!

•

AEROSOL AGE

FOR AERATING FOOD PRODUCTS

S.S. WHITE

TRADE MARK REG. IN U.S. PAT. OFF. & ELSEWHERE

NITROUS OXIDE · CARBON DIOXIDE MIXTURES FOR

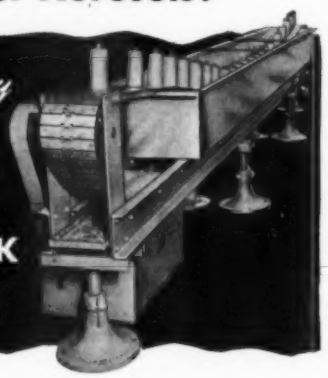
- WHIPPING CREAM
- MAYONNAISE
- SALAD DRESSINGS
- VEGETABLE OIL TOPPING

PROTECTION TO PROCESSORS UNDER PATENTS 2,250,330 GOOSMANN 2,155,260 DIELER

THE S.S. WHITE DENTAL MANUFACTURING COMPANY, 211 SO. 12TH ST., PHILADELPHIA 5, PA.

Test your Aerosols!

Automatically in ISLAND'S new HEAT and LEAK TEST TANK



Stainless steel Rex Table-Top chain, available in various widths for single or double lines of cans...and the cans are prevented from slipping on the incline and decline by magnets attached to the chain track. The tank itself may be constructed.in hot dipped galvanized or stainless steel, and the unit serves as both a heat and leak test tank.

FREE! MAIL THIS COUPON FOR FULL DETAILS

Island Equipment Corp.
27-01 Bridge Plaza North
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Dept. AA9

Please send particulars on new HEAT and LEAK TEST TANK

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ADDRESS.....

CITY.....STATE.....

PRESSURE TESTER for Aerosol Containers

as illustrated
$8.75

specify 60,100 or 160 pound gauge

other items:

snap-on screw tops for aerosol cans

cold and pressure fillers

glass bottle cappers

stainless containers, Formica tops & cabinet bases

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AEROSOL PRODUCT DEVELOPMENT

Consulting — Research — Testing

The Safest Path to Successful Products

AEROSOL PROCESS CO., Inc.

212 Grove St., Bridgeport 5, Conn.

PHONE FOrest 7-3662

CONFIDENTIAL UNBIASED

The only Company devoted exclusively to development and research on Aerosols

Want a good man? . . .

or a good job?

Have you something to sell?

Looking for something to buy? . . .

Run a classified ad . . . in the pages of

AEROSOL AGE.

CLASSIFIED ADVERTISING

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment which *Aerosol Age* will run without charge. Check must accompany all classified advertisements. Address all replies to Classified Advertisements with Box Number, care of *Aerosol Age*, Box 31, Caldwell, N. J. Closing date: tenth of month preceding month of issue.

U. S. Representative Wanted: Largest manufacturer of aerosol equipment in Europe seeks representation in the United States. Complete line includes filling machines, valve clinching machines, electrically heated test bath, dust and particle remover, laboratory testing cabinet, compressors, etc. Correspondence is invited from firms with facilities and acquaintance with the aerosol industry in the United States which would fit them to act as exclusive U. S. distributors for this complete and well-known line of aerosol equipment. Address Box 101, c/o AEROSOL AGE.

Position Wanted: Aerosol executive seeks position offering responsibility and opportunity for promising future to a man who has had wide experience in the field. Address Box 102, c/o AEROSOL AGE.

Foreman — Supervise and maintain new aerosol line with general knowledge of other packaging. Philadelphia area. Salary open. Reply in confidence. Address Box 100, c/o AEROSOL AGE.

Wanted: Interested in purchasing any quantity of aerosols—any kind or type. Close-outs, and runs or overstock. Insecticide, SNOW, air refreshers. Write Box 103, c/o AEROSOL AGE, stating quantity, type, price.

Kenny Crown Treasurer

John J. Kenny, formerly manager of the company's accounting, has been elected assistant treasurer of Crown Cork & Seal Co., Inc., Philadelphia. He joined the company in 1943 as an accountant, becoming chief accountant in 1949 and manager of accounting last year. Before joining Crown he was a member of the Baltimore staff of Haskins & Sells.

Mr. Kenny is a member of the American Institute of Accountants and is a director of the Baltimore chapter of the National Association of Cost Accountants.

Editorial

(*from page* 11)

inadequate basis for receipt of such an important award. Perhaps in future years thought might be given to the possible desirability of adding other points for consideration by the judges such as "practicality and functionality" or "suitability for the purpose intended." We have the feeling that the addition of such requirements would, over the years, build more standing for these already very important awards.

WANTED — CHEMISTS, ENGINEERS, MECHANICS

Unusually Interesting Work in Aerosols

The nation's largest aerosol manufacturer needs technical people for plants in New York, Chicago, Los Angeles.

CHEMISTS — Research and Control
ENGINEERS — Creative men who can design equipment
MECHANICS — Capable of maintaining production machinery

These men should have some related experience, but we will train the right people. Our firm is 20 years old with young aggressive leadership. This is an outstanding opportunity to join the top company in a rapidly expanding industry. Submit complete background resume.

G. BARR & CO.

3601 S. Racine Avenue
Chicago 9, Illinois

THE MAGAZINE OF PRESSURE PACKAGING

Your Advertisement Here . . .

will carry your sales message to potential buyers throughout the entire aerosol field. If you supply materials, equipment or services to any section of this rapidly expanding market, AEROSOL AGE is your logical first selection as an advertising medium, because:

- *it gives complete coverage of the entire aerosol market*
- *no waste circulation*
- *minimum rate*
- *it is the only publication edited specifically and exclusively for the aerosol field*

Circulation — 4500

Advertising rates on request

AEROSOL AGE

(Affiliated with Industry Publications, Publishers of *Agricultural Chemicals and Modern Lithography*)

P. O. Box 31
Caldwell, N. J.

***N. Y. Phone:* BArclay 7-7121**

***New Jersey Phone:* CAldwell 6-5520**

(*Continued from Page 29*)

a well-publicized test for effectiveness of fire extinguishers, — not to qualify them for approval, but rather to get an idea of their capacity. Such a test, The Chief advised, should represent an actual home fire, and be the type test that would not necessarily require laboratory procedure.

•

F.T.C. Cites Aerosol Loader

The Federal Trade Commission in a complaint issued June 29 charged U. S. Packaging Corp., Bridgeport, Conn., and four officers of the company with false, misleading and deceptive claims as to the amount of product packed in containers of "Frosty Snow." The complaint alleges that the company packed only 10.5 ounces of aerosol snow in a 16 ounce container, while using statements on labels and in advertising that cans of competitors were smaller.

The F. T. C. has requested officers of the corporation to appear at a hearing in Bridgeport, September 18th, to show cause why an order should not be entered requiring that they cease and desist from the violations charged in the complaint.

•

Aerosol Fire Extinguisher

The Astoria Manufacturing Co., Long Island City, N.Y., has begun marketing a new aerosol fire extinguisher, "The Little Giant," which sprays a stream of foam to quench all types of small fires. The extinguisher doubles as a drier for wet ignition wires and parts in car and other engines and motors.

•

New Can Co. Sales Posts

L. G. Weiner, former department supervisor of sales in the American Can Company's Central division, New York, was named assistant to the sales manager. R. C. Coleman, former assistant sales manager of the Chicago district, becomes manager of the firm's Gulf district, with headquarters in New Orleans; J. M. Dalton was named assistant Chicago district sales manager, and Paul M. La France becomes commodity manager.

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with the Aerosol Field!

...by subscribing to *AEROSOL AGE*

(only $2.00 for 12 issues)
In U.S.A. only

- In a rapidly expanding market like the aerosol field, only a magazine devoted specifically and exclusively to aerosols can keep you up to date on latest developments.
- This sample copy will give you an idea of the type feature articles by industry authorities — and complete news coverage — which AEROSOL AGE will bring you every month.
- Why not send in your subscription card right now to make sure that you get every issue of AEROSOL AGE — a magazine that's indispensable to your business.

• *Use the handy postpaid subscription card on page* 39.

AEROSOL PUBLICATIONS **CALDWELL, NEW JERSEY**

OVER THE TRANSOM

BACK in the early aerosol days of the NAIDM (now the CSMA of course) a program chairman could always assure himself of a hot and well attended session by carding a symposium on Aerosols vs. Space Sprays. Some of the comments make rather funny reading today. But the advice given by Russ Stoddard at one of these sessions still reads very well even after the passage of the years. He said he saw no reason whatsoever why the industry or those in it should take sides in the support of one method of application against another. Insecticide manufacturers should boost both aerosols and space sprays, he argued cogently, because they are both good products and both have a place. Aerosols would simply represent that much plus business. Time has proved the wisdom of his advice, for despite the rapid increase in sales of aerosols, there is still a very profitable volume of business from space sprays.

* * *

Ever wish it had been you that invented the safety pin, the talking machine or the sanitary water closet? And think how wealthy you could have been by now? Well, most any of us reading these lines could have invented aerosols, for the basic idea is just a few years old. It was being batted back and forth, as a matter of fact, in some of those very dry and extremely scientific papers that used to put most everyone to sleep in NAIDM sessions back twelve or fifteen years ago. A lot of us have been right outside the door during the period from birth of the idea right on through to its expansion into a quarter of a billion dollar industry.

* * *

But then, we reflect, the inventors are too often the unsung heroes. Sometimes they get a little credit, but how often do they end up with much of the cash? No, it's the boys with the commercial bent, who come along later, that make the dough. The valve manufacturers, container and propellant suppliers, custom fillers, even maybe a publisher or two.

* * *

"Which way will Pennsalt plump on spelling the industry's Number 1 word," asks an interested reader? Will they join Du Pont with the "ent" form, or go along with General Chemical's "ant" version? The question intrigued us and we sought the answer from Wiley Pickett who will be in charge of "Isotron" sales when the new Pennsalt plant starts into production.

* * *

While we have gone along with the "ant" spelling ourselves, we must admit the decision wasn't based on any overwhelming conviction. The DuPont theme that the "ant" ending is too suggestive of explosives, and "ent" is more appropriate for an aerosol ingredient has much merit, it seems to us. In any case we will be only too happy to be guided by our readers' opinions. Did we do right — or wrong? Let us have your votes one way or the other. If you will give us a sign, we'll promise to spearhead a movement to try to get everyone together on one form or the other. Which one, we don't really think matters so much.

* * *

Glass containers for aerosols are reported to be selling at a tremendously increased rate this year. Production is reported to be currently in the neighborhood of forty million containers a year, as compared with the fourteen or fifteen million glass aerosols made in 1955. Cosmetic firms are taking the glass packages as fast as they can be turned out. When anticipated demand from the pharmaceutical field starts to materialize, today's production will seem like a drop in the bucket. As we get the story, two or three years may see ten times as many glass aerosol packages going to the pharmaceutical field. Feminine hygiene is a possible new application for aerosols to which much attention is being given.

* * *

Glass, however, may shortly have a strong competitor in the aerosol field. A nylon container is currently in the test stage by a big factor in the industry. As opposed to glass, it offers the advantage of being non-shattering, it can be molded in any shape and it gives truer colors. And, reportedly, the usual drawbacks of effect on the perfuming ingredients have been solved with this particular plastic. Look for big developments here shortly.

Current Facts on AEROSOL AGE To Help You in Schedule Planning For this Fall and 1957

EDITORIAL:

For the first time, here is a magazine which gives thorough coverage of the entire aerosol field — insecticides, cosmetics, personal products, paints, pharmaceutical and food aerosols. During our first five months of operation we have published 150 pages of top editorial material on all phases of the industry, and the response has been enthusiastic. The dozens of letters which reach us prove conclusively that AEROSOL AGE has been welcomed by the industry. It is, of course, the first publication dealing specifically and exclusively with matters of direct concern to the aerosol industry.

EDITORIAL QUANTITY AND QUALITY!

CIRCULATION:

Our circulation prospect list, developed from the customer and prospect lists of thirty leading suppliers is still being continually checked and refined against new lists. Our growing subscription list is particularly encouraging. Paid subscribers now number 1600 out of a total circulation of 4500 — and the list is growing steadily. (85% of our circulation goes to individual names.) We want to reach everyone with a real interest in the aerosol field, — and will be glad to have an opportunity to check your customer and prospect lists.

THOROUGH COVERAGE OF THE ENTIRE FIELD — NO WASTE!

ADVERTISING ACCEPTANCE:

Advertising response in our first five issues has been very good.

20 custom and contract packers using 33 pages.
9 container companies using 21 pages.
9 insecticide companies using 20 pages.
8 aromatic companies using 18 pages.
8 valve companies using 15 pages.
5 propellant companies using 13 pages.
10 equipment companies using 10 pages.

Practically all of the leading suppliers to the aerosol field are using AEROSOL AGE for a grand total of 130 pages of advertising in our first five issues.

ADVERTISING ACCEPTANCE FROM THE LEADERS!

Advertising Rates on Request

If you're interested in selling more to the Aerosol field — it only makes sense to concentrate in

AEROSOL AGE

P. O. BOX 31 **CALDWELL, NEW JERSEY**

the AEROSOL VALVE for Your Product by PRECISION

The picture tells a story... the story of over-whelming popularity, tremendous growth and continued reliance on a quality product . . . PRECISION VALVE.

The use of over 300,000,000 time-tested valves by hundreds of completely satisified customers throughout the world, is your assurance that PRECISION has the answer to your aerosol program regardless of product or container.

We invite your inquiry to enable our staff of aerosol valve technicians to work cooperatively in satisfying your valve requirements.

PRECISION

Precision Valve Corporation

700 NEPPERHAN AVENUE • YONKERS 3, NEW YORK